Indoor Gas Heating Products

Unit Heaters
Duct Furnaces

February 2001

UH-PRC002-EN

Introduction

Trane unit heaters represent a technological breakthrough in quality. Trane offers customers the most complete line of unit heaters anywhere. And every unit in the line has been rated for 80 percent thermal efficiency or better.

But higher thermal efficiency and lower operating costs are just two features of this product line. Innovation — the engineering advances you've come to expect from Trane — can also be found across this entire line of unit heaters. And rugged, quality construction provides years of dependable service.

Quality products mean Trane value. So does fair, competitive pricing. The 10-year warranty tells you Trane will be here for the long haul — keeping our commitment to you. You can count on Trane standing behind every unit shipped. That is what Trane value means.

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Features Highlights

Ten-Year Warranty

The complete heat exchanger, draft hood assembly of the unit heater and burners are warranted by Trane to be free from defects in material and workmanship for a period of 10 years from the date of manufacture. (Warranty not applicable on duct furnaces or Separated Combustion units.)

Quiet Operation

Trane unit heaters incorporate an exceptionally balanced fan blade to assure quiet operation.

Heat Exchangers

All Trane heat exchangers are available in three types of steel:

- Aluminized Steel (Standard)
- 409 Grade Stainless Steel (Optional) (30-400 MBh units)
- 321 Grade Stainless Steel (Optional) (100-400 MBh units)

24V System

All units are equipped with a 24V control system which is powered by a 24V transformer as standard equipment.

Fan Time Delay

The fan time delay is mounted at the factory as standard equipment (optional on duct furnaces). This feature eliminates an initial blast of cold air by allowing the unit to fire for a short period of time before actuating the fan motor. After the thermostat is satisfied (with burners off), the fan continues to operate for approximately one minute, removing residual heat from heat exchanger.

Burners

All sizes 30,000 through 400,000 Btu input are equipped with a proven design pressed steel burner having a unique “burner shade” protective device to prevent scale or foreign matter from plugging the burner ports.

Energy Saving Intermittent Pilot Control

The pilot burner is ignited only during each cycle of operation, thereby conserving energy during the off cycle.

LP/Natural Operation

All units are available for operation on either natural or LP gas from our factory.

Easy Access For Maintenance

All Trane unit heaters are so designed that the burner access panel is removed with just two screws. Burners are individually removable for inspection and servicing. Pilot is also accessible through side panel access door.

Test Fired

All Trane unit heaters are test fired to assure proper operation.

Ideal For Retrofit

Trane unit heaters let you pocket fuel savings from day one and provide years of dependable service.

Features and Benefits

High-Efficiency Propeller

Fan Unit Heaters

Trane high-efficiency propeller fan unit heaters achieve annual fuel savings of 20 to 25 percent over conventional gravity vented heaters.
Each unit features a factory-installed flue vent fan and sealed flue collector that controls combustion and excess air during the on-cycle.

Heated air no longer escapes through the draft diverter opening during the off-cycle. Energy saving intermittent pilot ignition reduces gas losses.The pilot only operates when required.

Horizontal power venting, smaller openings and single-walled vent pipe reduce heat loss. Higher efficiencies can reduce equipment and material costs as well as installation time.

High-Efficiency Centrifugal

Fan Unit Heaters

The high-efficiency centrifugal fan unit heater keeps energy costs down.The design advances achieve annual fuel savings of 20 to 25 percent over conventional gravity vented heaters.

In the past, these conventional gravity vented heaters lost heated room air through the draft diverter opening.

The high-efficiency centrifugal unit features integral power venting (factory-installed) and sealed flue collector for optimum combustion.
It reduces wind effects on the system's efficiency. Intermittent pilot ignition reduces pilot gas losses and the power drafter allows for horizontal venting through side walls. It all adds up to higher efficiencies and lower installation costs.

High Efficiency Indoor Duct Furnace

The high efficiency indoor gas duct furnace complements our current centrifugal and propeller fan lines.
All high efficiency lines were designed to achieve fuel savings of up to
25 percent over conventional gravity vented heaters.

Conventional gravity vented heaters lost heated room air through the draft diverter opening.The high efficiency line features an integral flue vent fan and sealed flue collector for improved combustion. It reduces air requirements and wind effects on the system's efficiency. Intermittent pilot ignition reduces pilot gas losses and the flue vent fan allows for horizontal venting through side walls.

DUCT FURNACES ARE APPROVED FOR BLOW-THRU APPLICATIONS ONLY.

Features and Benefits

Propeller Fan Unit Heaters

The Trane gas-fired unit heater is a complete heat generating and distributing plant, equipped with automatic safety controls, all packaged in a modern, streamlined, space saving, attractive casing for mounting near the ceiling. Propeller units are basically zero static pressure appliances. At no time should ductwork be used with propeller units.

The designs are certified by AGA and CGA as conforming with standards for safe and efficient performance.

Centrifugal Fan Unit Heaters

Centrifugal fan unit heaters are ideal for commercial and industrial applications where a low noise level is desired. Trane centrifugal fan unit heaters which operate at .2-inches W.C. are extremely quiet.

Centrifugal fan gas-fired unit heaters should be selected for applications where ductwork or discharge nozzles are to be used.

Separated Combustion Propeller Fan Unit Heaters

Separated Combustion Centrifugal Fan Unit Heaters

The Trane separated combustion units are designed for space heating in mildly hostile environments. These units can be installed where dusty, dirty, or mildly corrosive conditions exist or where high humidity or slightly negative pressure prevail.

Typical applications are industrial work areas with wood or textile dust, non-explosive contaminated environments, non-chlorine process areas, automotive and truck garages and greenhouses.

These units achieve higher seasonal efficiencies by using outside air for combustion, overcomes slight negative pressures near exhaust fans or paint booths and isolates burner from dust,

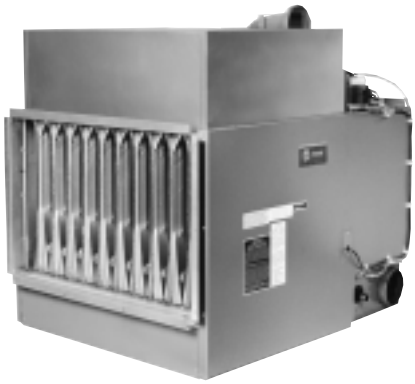
humidity and chemicals. The combustion process is separate from the environment where the unit is installed. A power venting system draws a controlled quantity of combustion air

from outside the building. The same system exhausts flue products to the outside. The burners, pilot and flue system are enclosed within the unit, thus the whole combustion process is literally unaffected by the atmosphere where the heater is located.

Features and Benefits

Tubular Heat Exchanger Propeller Fan Unit Heaters

TheTrane Company has added a new unit heater to enhance its broad line of heating products.TheTrane tubular heat exchanger is a very durable unit heater that provides an alternative to the traditional clam shell style.These are propeller style units that combine the latest tubular heat exchanger style with inshot burner technology to create a very efficient operating unit.



Separated Combustion Duct Furnace

TheTrane separated combustion duct furnace is designed to operate efficiently and reliably, even in environments that are dusty, dirty or mildly corrosive, or where high humidity or slightly negative pressure is present.

Applications include:

Industrial work areas with wood or textile dust

Non-explosive contaminated environments

Non-chlorine process areas

Automotive and truck garages

Greenhouses

Duct Furnaces

A duct furnace is normally installed in the distribution duct of an air conditioning system to supply warm air for heating. This definition applies only to an appliance which depends for air circulation on a blower not furnished as part of the furnace.

Knowledge and experience gained from thousands of installations over many years have gone into the design of the Trane gas-fired duct furnace. No effort has been spared to make this product one of the best obtainable.The objective was to produce an appliance that would be low in first cost and installation cost, dependable in performance and endowed with long life under normal operating conditions.

DUCT FURNACES ARE APPROVED FOR BLOW-THRU APPLICATIONS ONLY.

Horizontal Blower Assemblies

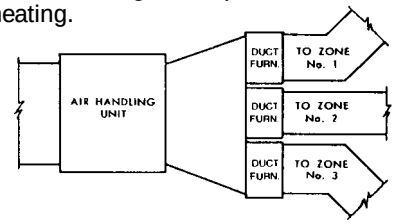
Trane horizontal blower assemblies have been specially designed for air handling systems of high static pressure in combination withTrane duct furnaces. They are matched against the proper furnace size for greatest efficiency of operation.

Application Considerations

General

Propeller fan unit heaters and centrifugal fan unit heaters are designed for use in space heating applications. The units are typically used in areas with high ceilings, and are exposed in the space to be heated. Unit heaters offer low installed cost, and are able to heat large volume areas without requiring extensive duct systems.

Duct furnaces are designed for use in ducted applications with a separate air handling device such as a horizontal blower assembly. By utilizing a separate air source, greater application flexibility in airflow delivery can be obtained. Multiple duct furnaces can be used with an air handling unit to provide zone heating.



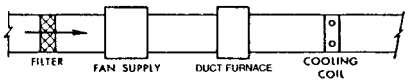
NOTE: When installing duct furnaces in parallel or in series, minimum clearance requirements must be considered. This is required for serviceability of the gas valve and the high limit. "All duct furnaces are approved in blow-thru applications only."

All duct furnaces are AGA approved upstream or downstream of the cooling coil. Recommend optional field installed drain pan when installed on the downstream side of the cooling coil.

NOTE: Downstream denotes cooling coil ahead of the fan section.

When used in conjunction with filters, cooling coils and an air handler, the duct

furnace can become part of a built-up heating and cooling system.



Typical Upstream Installation

Gas Heating Value

The majority of gas heating units are installed in applications where natural gas is readily available. In areas where natural gas is not available, Trane units may be ordered directly from the factory for use on LP (propane) gas.

Gas heat content varies by fuel type and location. The standard gross heating value for natural gas is 1,000 Btu per cubic foot, and for propane, 2,500 Btu per cubic foot. Significant variations selections. To account for variations in the gross heating value of the fuel, adjust the total heat input required and select the unit on the basis of the adjusted load using the following formula:

$$\text{Adjusted load} = \frac{\text{Calculated load} \times \text{gross heat value (Btu/cu ft)}}{\text{Actual gross heat value (Btu/cu ft)}}$$

Low Temperature Rise

Trane recommends against the setup of a unit which will result in a temperature rise of less than 30°F. With such low temperature rises, the flue gases passing through the heat exchanger are cooled to condensate before reaching the flue outlet. This condensate is corrosive and will result in shortened heat exchanger life.

Air Density

Catalog performance data is based on elevations up to 2,000 feet above sea level. Above 2,000 feet the unit's heating capacity must be derated four percent for each 1,000 feet above sea level, and special orifice selections are required. Table PAF-1 contains correction factors that can be applied to the unit's cataloged heating capacity, fan rpm, and fan bhp to obtain actual values for elevations above 2,000 feet.

Corrosive Atmospheres

Corrosion of heat exchangers and draft diverters have two basic variables – moisture (condensation) and sulphur. These two ingredients form to make sulfuric acid in the combustion process. Condensation occurs commonly in makeup air systems, using large amounts of fresh air, when air temperatures entering the heat exchanger drop to 40°F or below. This reaction can also occur in recirculating systems where some quantity of outside air is introduced upstream of the exchanger. The sulphur will always be present as an integral component of the gas. The resulting concentration of the acid is governed by the amount of sulphur in the gas. This concentration varies from gas to gas and geographically within the same type of gas.

Beyond sulfuric acid corrosion there is the area of chlorinated or halogenated hydrocarbon vapor corrosion. This type of corrosion occurs when substances are mixed with combustion air that will cause the formation of hydrochloric or hydrofluoric acid when burned. These basic substances are found in degreasers, dry cleaning solvents, glues, cements, paint removers and aerosol propellants. Specific chemicals included in this group are trichloroethylene, perchloroethylene, carbon tetrachloride, methylene chloride, methyl chloroform and refrigerants 11, 12, 21, 22 and 114.

If sufficient PPM content of these corrosives is present, none of the common heat exchanger materials will hold up. The dilemma becomes whether to place the gas heating equipment outside of the area to be conditioned, or use equipment in the space which does not burn a fuel such as gas (i.e. electric or hydronic).

Units should not be installed in areas with corrosive or inflammable atmospheres. Locations containing solvents or chlorinated hydrocarbons will produce corrosive acids when coming in contact with burner flames. This reaction will greatly reduce the life of the heat exchanger and may void the warranty. For added protection against heat exchanger corrosion, optional 409 and 321 stainless steel construction is available. On units using outside air, with entering air temperature below 40°F, condensation of flue gas in the heat exchanger is possible. In these cases, stainless steel heat exchangers are recommended.

Careful review of the job application with respect to use, probable contaminants within a conditioned space or the amount of fresh air to be brought in, will help to make the proper selection of heat exchanger material. This review will help to eliminate problems before they begin.

Application Considerations

Indoor Units

Indoor gas unit heaters and duct furnaces are used primarily in commercial and industrial structures such as manufacturing areas, warehouses, garages, stores, showrooms, lobbies and corridors.

Separated combustion units are used primarily in industrial work areas with wood or textile dust, non-explosive contaminated environments, non-chlorine process areas, automotive and truck garages and greenhouses.

Unit Placement

Refer to the applicable Trane Installation, Operation and Maintenance literature for specific installation instructions. Installations must conform with local building codes or in the absence of local codes with the National Fuel Gas Code ANSI Z223.1.

When selecting a location for an indoor unit heater, both the size and weight of the unit, as well as the heating requirements of the building, should be considered. Installation of units in airplane hangars or public garages should be in accordance with NFPA No. 409 for aircraft hangars, and NFPA No. 88 for garages.

For proper distribution, air should be directed towards areas of maximum heat loss. When multiple units are used, circulation of heated air around the space perimeter is recommended. Satisfactory results can also be obtained where multiple units are located toward the center of the area, with heated air being discharged toward the outside walls. Throw data for standard unit heaters and unit heaters utilizing optional discharge nozzles is shown in the General Data section, pages 19 and 20.

Locations where extreme drafts can affect burner operation should be avoided. Strong drafts may cause pilot outage. Units with intermittent pilot ignition may be preferable in areas where drafts are likely.

Minimum clearances required for accessibility and safety are listed in Table GD-1.

Throw Data

Throw data for units with standard louvers and for units with optional discharge nozzles are in the General Data section, pages 19 and 20. Optional nozzles are for use on propeller fan unit heaters, centrifugal fan unit heaters and duct furnaces. When greater throw distance is desired, a 45° nozzle is recommended. For high mounting heights, a 90° nozzle may be used. When wide diffusion is needed, a Y splitter nozzle should be considered. A five-way nozzle can be used for applications requiring even air distribution over a large floor area. (Five-way nozzles are not available on propeller fan unit heaters.)

Indoor Units — Venting

Gas fired indoor units require venting to remove the products of combustion. To help assure safe, trouble-free operation, follow the guidelines listed below:

Natural Venting

1
Provide a vertical flue of at least four feet.
2
Use a flue the same size as the flue opening on the unit.
3
Provide maximum vertical rise at the units.
4
Keep horizontal runs to a minimum and slope flue upward at least ¼-inch per foot. Horizontal runs should not exceed 75 percent of the vertical height of the vent pipe, or chimney, above the flue pipe connection.
5
Avoid short turns; 45° elbows are recommended.
6
The vent pipe should be at least six inches from combustible material and should be properly insulated when passing through combustible partitions.
7
Extend flue at least two feet above the highest point of the roof.
8
Tape flue pipe joints with fireproof paper or material.
9
Avoid installing units in areas under negative pressure.
10
Avoid running vent pipe through unheated spaces. When this cannot be avoided, insulate the pipe to prevent condensation of moisture on the inside walls of the pipe.
11
Where two or more units vent into a common flue, the cross-sectional area of the common flue must be equal to the larger vent connection plus 50 percent of the area of each additional vent connection. (Gravity vent units only.)
12
Do not damper the flue piping. Failure to open such a damper prior to operating the unit will result in the spillage of flue gas into the occupied space, activating the blocked vent (spill) switch.

Flue Vent Fans

Where chimneys of sufficient height are impractical, or where the distance from the heater to the chimney is so great that sufficient draft cannot be created, a flue vent fan can be used to vent the products of combustion. The flue vent fan is normally started and stopped by the room thermostat. A centrifugal switch in the flue vent fan operates the electric gas valve.

Dimensional data for the flue vent fan is shown in Table DW-14.

Application Considerations

Power Vented Units

Units with a factory installed flue vent fan.

1
All units must be vented. Power vented units are designed to use single wallvent pipe. A Breidert Type L, Field Starkap, or equivalent unit vent cap must be furnished by the customer.

2
The venting system for these appliances shall terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window or gravity air inlet into any building.

3
Through-the-wall vents for these appliances shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.

4
The vent pipe diameter must be as shown under "Recommended Flue Size" in the specification charts. An adaptor must be field supplied if required.

5
Each furnace must have an individual vent pipe and vent terminal. Vent pipe equivalent length must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.

6
Maintain 6 inch clearance between vent pipe and combustible materials. Vent terminal must be installed with a minimum clearance of 4 feet from electric meters, gas meters, regulators, and relief equipment.

7
Seal vent pipe joints to prevent leakage. Use General Electric RTV-108 or Dow Corning RTV-732 Silicone Sealant or 3M #425 aluminum foil tape.

8
Pitch horizontal pipes downward ¼-inch per foot toward outlet for condensate drainage. Horizontal portions of the venting system shall be supported at maximum intervals of 4 feet to prevent sagging.

9
Vertical vent pipes should be equipped with condensate drains.

10
Insulate single wall vent pipe exposed to cold air or running through unheated areas.

FM and IRI Requirements

IRI, which stands for Industrial Risk Insurers, and FM, which stands for Factory Mutual, are both basically insurance companies which insure commercial/industrial firms against a variety of losses. Both publish requirements which must be met by certain equipment operating in the facilities they are preparing to insure.

Listed below is our interpretation of the requirements of both insurers pertaining to heating units only to the extent of features/controls required by IRI and/or FM. There are a number of additional requirements which pertain to electrical service, details of installation, etc., and we urge you to obtain copies of the publications pertaining to these details if you are involved in a job where IRI or FM adherence has been indicated. The requirements detailed herein are our interpretations of the latest publications in our possession and we must disclaim any responsibility for errors due to our interpretation and/or lack of any updated revision of these standards. Our intent is to provide you with an understanding of the application of these standards and how we believe our indirect-fired gas heating equipment applies.

IRI Requirements

1
All input sizes require 100 percent shutoff. This requires that any natural gas unit, equipped with intermittent pilot ignition, must employ a "lock out" type ignition system which will shut off pilot gas if the pilot fails to light at any time. This system is required by AGA on LP gas units as standard equipment. However, for natural gas units, you need to specify on the order "Natural Gas, 100 percent shutoff."

2
All units require AGA certification or UL "listed" controls. Our units are AGA certified and meet this requirement.

3
Models with inputs of 150,000 to 400,000 Btu require "mechanical exhaust" and a "safety interlock." For our units this means a power vented or drafter equipped unit. In both instances, if the flue vent fan (factory or field installed) does not get up to speed, the unit will not fire, satisfying the safety interlock portion.

FM Requirements

1
All units must be AGA certified or UL listed. Our units are AGA certified.

2
The high limit control must be in a circuit, the voltage of which does not exceed 120 VAC. All of our high limits would meet this requirement.

The specific requirement for an "IRI or FM Gas Train," while it applies to direct and indirect-fired gas heating equipment as well as oil-fired, comes into play only with units having an input in excess of 400,000 Btu. This may be one of the reasons why the majority of gas heating equipment manufacturers (indirect-fired) limit their largest individual furnace to 400,000 Btu.

Application Considerations

Minimum / Maximum Gas Inlet Pressures

Gas valves are suitable to a maximum inlet pressure of 0.5 psi (14 inches water column) on natural gas. If the main gas supply pressure is greater than 14 inches W.C., a step-down pressure regulator must be field installed ahead of the gas valve. Minimum inlet pressure for natural gas units is 5 inches W.C.

For LP (propane) gas, the minimum inlet pressure is 11.0 inches W.C. and the maximum inlet pressure is 14.0 inches W.C.

High Pressure Regulators — Natural Gas Only

The Trane indoor gas heating products contained in this catalog, are designed to operate at a pressure of 3.5-inch W.C. (Water Column) when firing on natural gas. This is the "manifold" pressure or that which is present at the burner orifices. All five and six-function valves provide a built-in pressure regulator which is capable of reducing "supply" pressures from a maximum of 14-inch W.C. (½ psi) down to 3.5-inch W.C. on the leaving side of the valve. The valve typically "drops" about 1½-inch so the minimum supply pressure is 5-inch W.C.

Whenever supply pressures exceed 14-inch W.C., a high pressure regulator should be selected. We supply a Rockwell regulator which is fitted with pressure springs and capacity orificing to meet the requirements of each specific job.

In order to select the proper spring/ orifice combination, we need to know what the supply pressure is on that particular job and the input size of the unit being ordered. More than one unit can be run from one regulator; however, we recommend that each unit have its own regulator.

We require that the "job" supply pressure be included on all jobs requiring high pressure regulators along with the unit size. The table that follows displays the regulators range as it pertains to inlet pressure and MBh. N/A requires the customer to contact a local utility or an industrial supply house.

These devices are not available from Trane for LP gas. LP accessories must be secured from the gas supplier/ supply house.

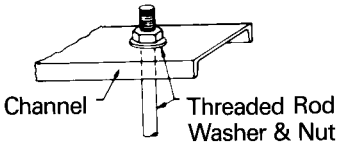
Table AC-1 — Orifice Chart: Rockwell 043-182 Regulator

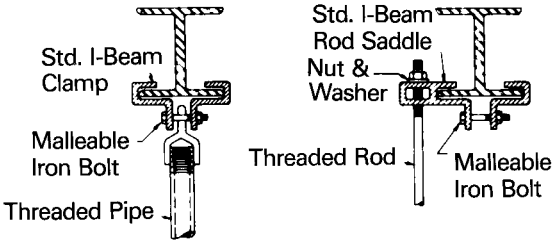
Inlet	Capacity in MBH for Natural Gas						Spring
Pressure	25-200	225-300	350-500	600	700	800	Required
1 psi	3/8"	N/A	N/A	N/A	N/A	N/A	Blue (only)
2	3/8"	3/8"	N/A	N/A	N/A	N/A	Blue (only)
3	3/8"	3/8"	3/8"	N/A	N/A	N/A	Blue or Green
5	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	Blue or Green
10	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	Blue or Green
20	1/4"	1/4"	1/4"	1/4"	1/4"	5/16"	Blue or Green
40	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	Blue or Green
60	1/8"	1/8"	1/8"	1/8"	1/8"	3/16"	Blue or Green
80	1/8"	1/8"	1/8"	1/8"	1/8"	N/A	Blue or Green
100	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	Blue or Green
125	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	Blue or Green

Application Considerations

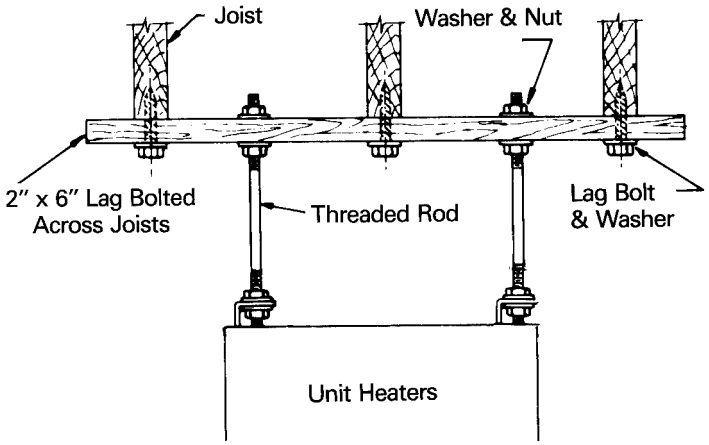
Mounting Detail
(Hanging Hardware Supplied by Others)

Steel Construction





Wood Construction



Application Considerations (Venting Unit Heaters)

Venting unit heaters and duct furnaces used to be as simple as remembering that warm air rises. With the introduction of new venting equipment and safety controls, things have become a little more technical. Today's contractor has to know a lot more about proper venting to get the job done within code at a reasonable price.

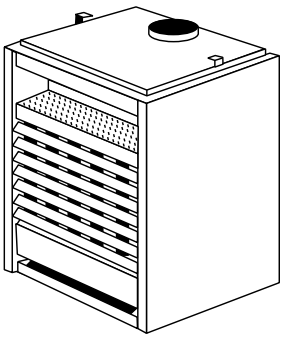
For starters ANSI now categorizes vented appliances into four categories. Category I includes non-condensing appliances with negative vent pressure, like the traditional atmospheric unit heater.

Venting Categories

	Non-Condensing	Condensing
Negative Vent Pressure	I	II
Positive Vent Pressure	III	IV

Category II groups condensing appliances with negative vent pressure.

Category III appliances are non-condensing and operate with a positive vent pressure, like the traditional power vented unit heater. Category IV covers condensing appliances with positive vent pressure.



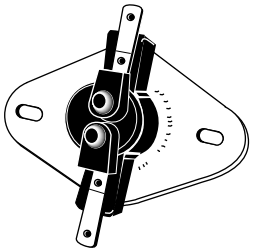
Natural Draft Unit Heaters

The gravity vented unit heater still has the greatest acceptance, but the new high efficiency of gravity unit heaters add some new twists to venting. As efficiency rises more heat gets extracted from the flue gas. This heat had been driving the vent system in natural draft systems. With lower flue gas temperatures, velocities in the chimney decrease. In turn this lower velocity can cause flue gases to reach the point at which they will condense.

When a factory owner replaces an old unit heater, having an efficiency of 65 percent, he expects to benefit from the higher efficiency of the new unit. This efficiency brings a system change with it in the form of lower flue temperatures, closer to the dewpoint.
If the old stack isn't corrosion resistant deterioration may be sudden. The mild acid that forms when vent gas condenses will gradually eat away at the metal. Eventually the stack will rust through leaking fumes and condensation.

To avoid condensation be certain to use stacks of the right size. Oversize stacks draw slower, allowing more time for condensation. For naturally vented units use B vent. This insulated vent pipe contains vent heat, reducing the chances of condensation. This is particularly important for vents running through unheated areas.

In addition to problems from condensation, contractors have had to become aware of new mandated controls. In addition to a high limit switch, the primary power circuit for naturally vented atmospheric gas unit heaters now contains a "spill" switch. This switch, a manually resettable thermo disk type device, senses a blocked flue. Sensitive to a rise in temperature in the draft diverter, the spill switch cuts off power to the gas valve stopping combustion.



Spill Switch

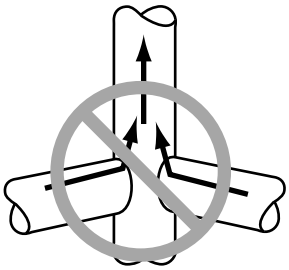
Problems arise in buildings that have experienced back drafting from negative pressure for years. As new units replace old, the back drafting causes the units to shutdown, uncovering a makeup air problem that has gone uncorrected for years.

Sharing Flues with Other Appliances

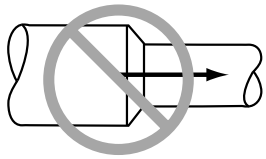
Traditionally unit heaters get installed in pairs, sharing a common flue between two heaters. When a unit heater must share a flue with another appliance a few cautions are appropriate.

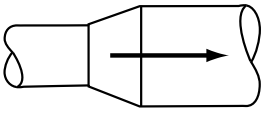
Always be certain that the flue can handle the combined operation of all appliances connected to it. Never assume that one appliance will operate at a time. When connecting into the stack or breaching always connect the device with the largest input first. This limits the potential for flue gases to escape out other outlets and warms the entire chimney. Avoid installing appliances directly across from each other when entering the stack. This might force the draft from one appliance to vent out the opposing draft diverter.

When piping to a stack NEVER reduce the appliance vent size. Use smooth transitions and long bends. Abrupt transitions and tight elbows create resistance and turbulence that can limit vent capacity. Never connect power vented devices to common flues. Mechanically vented appliances must have dedicated vents to the point of termination.



Tie smaller units into larger. Avoid cross connections that feed backwards into another flue.





Application Considerations (Venting Unit Heaters)

Power Vented Unit Heaters

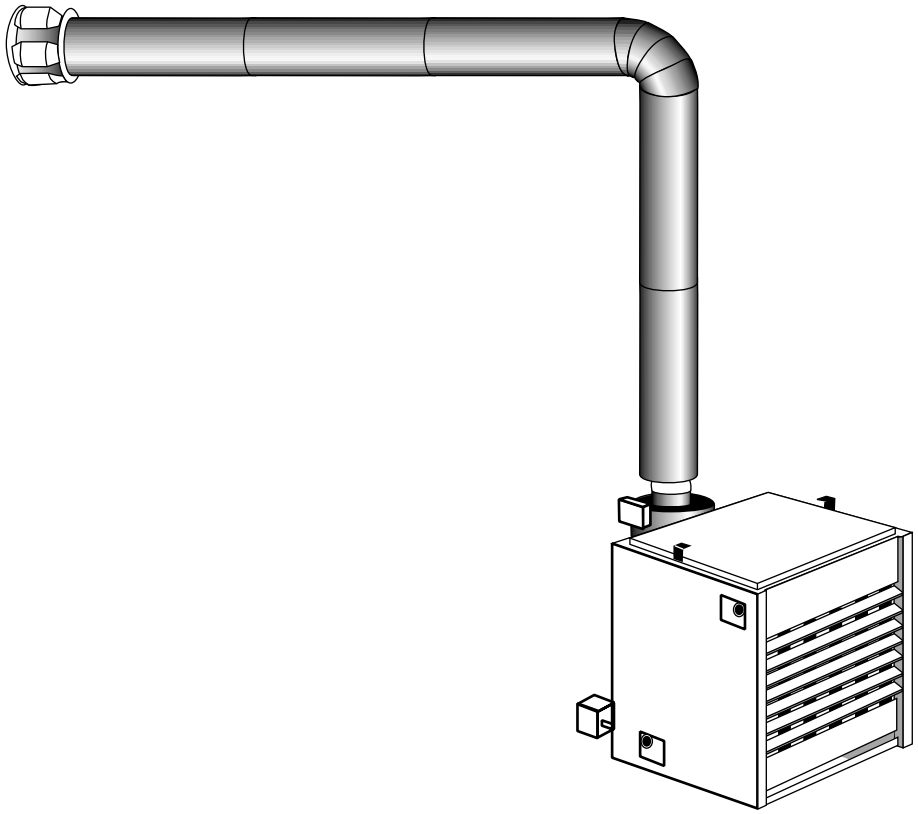
Mechanically vented appliances have enjoyed increasing acceptance in American facilities. Power vented unit heaters allow installation without the need to penetrate expensive roofing materials. They also offer more flexibility in placement of individual unit heaters.

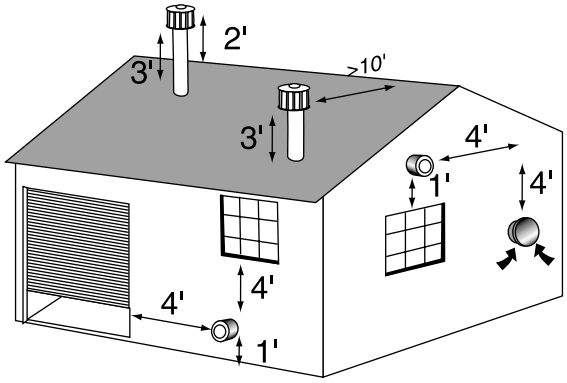
Mechanical venting occurs when a power blower provides a positive air flow to exhaust vent gas. The blower may be mounted at the unit heater or at the point of termination. With a factory installed power venter, a pressure switch detects the flow of vent gas before the gas valve is allowed to open. With third party drafters usually a centrifugal switch monitors the operation of the blower motor. When properly installed, the switch senses motor rotation and allows the gas valve to operate. Interlocking the blower to the gas valve provides some control over the combustion process. Using a factory unit with a pressure sensitive switch ensures that control.

With all their advantages power venters bring some requirements as well. Each manufacturer determines the maximum length of pipe and fittings that his system can use for safe operation. Remember to count the fittings and allow for their higher resistance to flow. The total length of run includes not only the piping length but the resistance of all the fittings including the termination cap.

Many contractors have become accustomed to using B vent with natural draft units. Used with power vented appliances indoors, B vent is unacceptable. B vent does not allow positive pressure in the vent piping to be sealed from the heated space. Proper installation uses 24-gauge, single wall vent pipe and each joint sealed with temperature resistant sealant or tape.

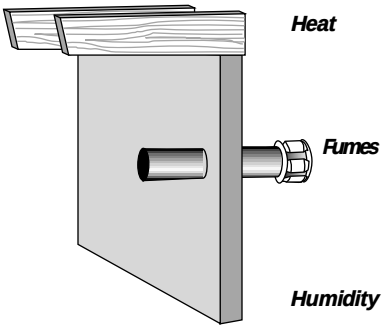
Power Vented Unit Heater

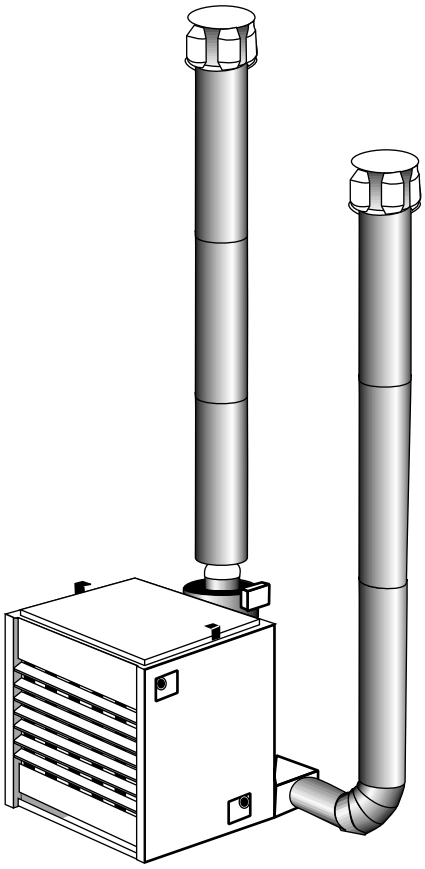




Vent Termination Locations (minimum distance)

Application Considerations (Venting Unit Heaters)





Contractors must also be aware of the conditions at the point of termination. The National Fuel Gas Code NFPA 54/ ANSI Z223.1-1992 mandates that vent system should terminate at least 4 feet below, 4 feet horizontally or 1 foot above any window, door, or gravity inlet to a building. Termination with a vent cap approved by the manufacturer should occur well above the snow line.

Beyond satisfying the codes, vents should be positioned away from shrubs and plants that might be affected by unseasonable warming by the exhaust. Sidewall vents release a considerable amount of water vapor that may condense on cold siding, adversely affecting painted surfaces. Placing these vents in locations that get natural air circulation from prevailing winds may help to reduce these negative effects.

Separated Combustion Venting

Another form of mechanical venting includes those unit heaters that use a powered exhaust also to pull in outside air. Most often found on condensing furnaces, separated combustion does not use room air for combustion. Instead these unit heaters use a second run of pipe to supply fresh outdoor air.

The separated combustion approach offers several advantages. First, it does not use warm indoor air to fire the unit heater. This saves energy by avoiding drawing unheated make-up air into the living space. Second, the unit heater has an unlimited source of air for combustion. In many of the new super insulated buildings appliances can be starved for combustion air. In contaminated atmospheres the use of separated combustion unit heaters assures that the heat exchanger sees only non-corrosive air.

When positioning the intake and exhaust vents on separated combustion equipment, the intake and outlet must mount on the same outside surface. This ensures that any wind effects balance out. Remember to keep the vents at least 18” apart to avoid drawing exhaust air into the intake air.

With Trane’s separated combustion unit heaters intake air and exhaust air run through standard 24-gauge galvanized pipe. Remember that separated combustion unit heaters still have high vent temperatures. Use of PVC, CPVC and other plastic vent materials are inappropriate and hazardous. Check the manufacturer’s instructions before piping any appliance.

The vent gases of power vented and separated combustion unit heaters may condense on a cold start-up or when vent piping runs through unheated areas. To protect the heater always pitch both intake and exhaust piping toward the outside of the building. Remember also that no power vented equipment can share a common flue with any other appliance. Should a flue become blocked one appliance could vent into the occupied space.

Approved vent caps should be used on both the intake and exhaust terminations. For greater convenience Trane offers a concentric vent adapter that allows venting through a single perforation through the building wall or roof.

Opportunities Using Trane Gas Products

Whatever venting configuration your job requires, Trane offers a unit heater to meet your needs. Trane offers the reliability of traditional standing pilot systems, always vented by natural draft. We offer spark ignition natural draft and power vented unit heaters and the new separated combustion unit heaters.

Selection Procedure

Determine the total heating load requirements in accordance with methods recommended by the ASHRAE Handbook of Fundamentals or other acceptable means.

Propeller Fan Unit Heater

1
From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2
Airflow (cfm) and temperature rise can be read directly from the performance data tables.
3
Knowing the mounting height of the unit, throw can be determined from the performance data table. If the throw is not adequate, consider using a larger propeller fan unit heater or a centrifugal fan unit heater with an optional discharge nozzle for greater throw.

Selection Example —A natural gas propeller fan unit heater that can provide 75 MBh heating output is required. The unit will be mounted 10 feet above the floor and a 40-foot throw is required.

Select the unit as follows:

a
From Table PD-5, select a GPND-010 with a 100.0 MBh input and 80.0 MBh heating output, 1,480 cfm and a 50°F temperature rise.
b
From Table GD-2, throw at a mounting height of 10 feet is 54 feet.

Centrifugal Fan Unit Heater

1
From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2
Airflow (cfm) ranges are listed for each unit size in the performance data tables. Knowing either the desired airflow or temperature rise, the other can be calculated using the following formulas:

$$cfm = \frac{Output \times 1{,}000}{1.085 \times \Delta T}$$

$$\Delta T = \frac{Output \times 1{,}000}{1.085 \times cfm}$$

3
Knowing the mounting height of the unit, throw can be determined from the performance data table. If the throw is not adequate, a discharge nozzle can be used to obtain additional throw.

Selection Example —An LP (Propane) gas centrifugal fan unit heater that can provide 150 MBh heating output is required. An airflow of 2,000 cfm is desired. The unit will be mounted 12 feet above the floor and a 65-foot throw is required.

Select the unit as follows:

a
From Table PD-7, select a GCPD-020 with a 200.0 MBh input and 160.0 MBh heating output. An airflow of 2,000 cfm is within the allowable range, and temperature rise is calculated as follows:

$$\Delta T = \frac{MBh \times 1{,}000}{1.085 \times cfm}$$

$$\Delta T = \frac{160 \times 1{,}000}{1.085 \times 2{,}000} = 74.0°F$$

b
From Table GD-2, throw at a 12-foot mounting height is 61 feet. As a 61-foot throw is not adequate, a 60 degree nozzle can be selected (from Table GD-4) which provides a throw of 76 feet.

Duct Furnace

1
From the performance data tables, select the unit whose heating output meets or exceeds the heating load requirement.
2
Given the airflow to be supplied to the duct furnace, temperature rise and pressure drop through the duct furnace can be read directly from the performance data charts. If the air temperature rise is below 30°F, some supply air must be bypassed around the duct furnace. If the air temperature rise is over 80°F, additional supply air must be delivered to the duct furnace.

Selection Example — A natural gas duct furnace that can provide 300 MBh heating output is required. An airflow of 5,000 cfm is being provided to the duct furnace.

Select the unit as follows:

a
From Table PD-8, select a GDND-040 with a 400.0 MBh input and 320.0 MBh heating output.
b
From Chart PD-1, temperature rise at 5,000 cfm is 58°F and pressure drop is 0.16 inches.

Horizontal Blower Assembly

1
From the performance data tables, select the blower assembly that provides the needed airflow at the required static pressure, and determine the required motor size and fan speed.
2
If a blower assembly is to be used with a duct furnace, refer to the dimensional data table to determine which blower to use with the given duct furnace. The duct furnace pressure drop must be added to the pressure drop of the duct system before entering the blower assembly performance data tables. Enter the performance data table at the required airflow and at the total external static pressure to determine the motor size and fan speed.

Selection Example — A GDND-040 duct furnace is to be used with a horizontal blower assembly. An airflow of 5,000 cfm is required. The pressure drop of the duct system is 0.54 inches, and the pressure drop of the duct furnace is 0.16 inches.

Select the unit as follows:

a
From Table DW-13, select a HBAC-45 for use with the GDND-040 duct furnace.
b
From Table PD-9, an HBAC-45 at 5,000 cfm and 0.7 inches static pressure (0.54 inch ductwork + 0.16-inch furnace) requires a 1½ hp motor with a fan speed of 720 rpm.

Model Number Description

Indoor Gas Heating Units

G	P	N	D	003	A	A	F	1	0	0	0	0	+
1	2	3	4	5,6,7	8	9	10	11	12	13	14	15	

Digit 1 — Gas Heating Equipment

Digit 2 — Product Type

P = Propeller Fan Unit Heater
B = High Efficiency Centrifugal Fan Unit Heater
C = Centrifugal Fan Unit Heater
D = Indoor Duct Furnace
L = High Efficiency Indoor Duct Furnace
H = High Efficiency Propeller Fan Unit Heater
A = Separated Combustion Propeller Fan Unit Heater
K = Separated Combustion Centrifugal Fan Unit Heater
M = Separated Combustion Indoor Duct Furnace
T = Tubular Heat Exchanger - Propeller Type
S = Special

Digit 3 — Fuel

N = Natural Gas
P = LP Gas (Propane)
S = Special

Digit 4 — Development Sequence

D = Fourth Generation

Digits 5-7 — Input Capacity

Single Furnace	
003 = 30 MBh	R03 = 30 MBh
004 = 45 MBh	R04 = 45 MBh
006 = 60 MBh	R06 = 60 MBh
007 = 75 MBh	R07 = 75 MBh
009 = 90 MBh	R09 = 90 MBh
010 = 100 MBh	022 = 225 MBh
012 = 125 MBh	025 = 250 MBh
015 = 150 MBh	030 = 300 MBh
017 = 175 MBh	035 = 350 MBh
020 = 200 MBh	040 = 400 MBh

*Residential - Tubular Only

Digit 8 — Main Power Supply

A = 115/60/1	E = 460/60/3
B = 230/60/1	F = 575/60/3
C = 208/60/3	S = Special
D = 230/60/3	

Digit 9 — Gas Control Option

A = Single-Stage, Standing Pilot
D = Single-Stage, Intermittent Pilot Ignition
E = Two-Stage, Intermittent Pilot Ignition
F = Hydraulic Modulating, Intermittent Pilot Ignition (60-100°F)
G = Hydraulic Modulating with Bypass, Intermittent Pilot Ignition (60-100°F)
H = Electronic Modulating with Room T-Stat, Intermittent Pilot Ignition
J = Electronic Modulating with Duct-Stat, Intermittent Pilot Ignition
K = Single-Stage, Hot Surface Pilot Ignition
L = Electronic Modulating with External 4-20 mA Input
N = Electronic Modulating with External 0-10 VDC Input
P = Hydraulic Modulating, Intermittent Pilot Ignition (75-150°F)
R = Hydraulic Modulating with Bypass, Intermittent Pilot Ignition (75-150°F)
S = Special

Digit 10 — Design Sequence

F = Sixth Design

Digit 11 — Heat Exchanger Material

1 = Aluminized Steel
2 = #409 Stainless Steel[2]
3 = #321 Stainless Steel[3]
S = Special

Digit 12 — Rooftop Arrangements

0 = None (Indoor Unit)
S = Special

Digit 13 — Rooftop Heating Unit Motor Selection

0 = None (Indoor Unit and Rooftop Duct Furnace
S = Special

Digit 14 — Rooftop Fan Section

0 = None (Indoor Unit and Rooftop Duct Furnace)
S = Special

Digit 15 — Miscellaneous Options — All Units

0 = None
A = #409 Stainless Steel Burners[3]
B = Orifices For Elevation Above 2000 Feet (Specify Elevation)
S = Special

Propeller Fan Unit Heater (Std., Hi-Effic. and Separated Combustion)

C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
E = Vertical Louvers
J = Totally Enclosed Motor
7 = OSHA Fan Guard

Centrifugal Fan Unit Heater (Std., Hi-Effic. and Separated Combustion)

C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
E = Vertical Louvers
H = Duct Discharge Flange
J = Totally Enclosed Motor

Duct Furnace (Indoor) (Std. or Hi-Effic.)

C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
F = Horizontal Louvers
G = Horizontal and Vertical Louvers
K = Side Access Burner Drawer (Left Hand)*
L = FanTime Delay Control
M = Side Access Burner Drawer (Right Hand)*

Separated Combustion Indoor Duct Furnace

C = #409 Stainless Steel Draft Diverter
D = Summer-Winter Switch
F = Horizontal Louvers
G = Horizontal and Vertical Louvers

Tubular Heat Exchanger, Propeller Type

J = Totally Enclosed Motor
7 = OSHA Fan Guard

Notes:
1. All units are AGA approved. For CGA approved units, contact Clarksville Technical Support.
2. Available on the tubular sizes 100-400 only.
3. Not available for tubular.
*The left or right hand side of the side access burner drawer, options K & M, is determined by facing the air outlet side of the duct furnace.

Model Number Description (Horizontal Blower Assembly)

Horizontal Blower Assembly

HBA	C	15	A	A	A	C	0	+
1 2 3	4	5 6	7	8	9	10	11	

Digit 1-3 — Horizontal Blower Assembly

Digit 4 — Development Sequence

C =Third Generation

Digit 5-6 — Blower Size

15= Nominal 1500 cfm
20= Nominal 2000 cfm
30= Nominal 3000 cfm
45= Nominal 4500 cfm

Digit 7 — Transition Size

(Specifies Duct Furnace Size)

0 = None

A = 100 MBh	F = 225 MBh
B = 125 MBh	G = 250 MBh
C = 150 MBh	H = 300 MBh
D = 175 MBh	J = 350 MBh
E = 200 MBh	K = 400 MBh

Digit 8 — Main Power Supply

A = 115/60/1	D = 230/60/3
B = 230/60/1	E = 460/60/3
C = 208/60/3	S = Special

Digit 9 — Motor Horsepower

A = 1/3 hp	E = 1½ hp
B = ½ hp	F = 2 hp
C = ¾ hp	S = Special
D = 1 hp	

Digit 10 — Design Sequence

C = Third Design

Digit 11 — Miscellaneous Options

0 = None
1 = Insulation
3 = Totally Enclosed Motor
S = Special

General Data

Table GD-1 — Minimum Clearances

	Duct Furnace	Propeller & Centrifugal Fan U.H.
Sides	18”	18”
Top	6”	6”
Bottom	21”*	21”
Flue	6”	6”

*21” clearance is required for bottom access to burners and pilot. If a side pull-out burner drawer is ordered (duct furnace only), bottom clearance can be reduced to six inches. Side clearance, however, must be increased such that it is adequate for burner drawer removal. Reference Tables DW-10 and DW-11.

Standard Unit Heater Applications

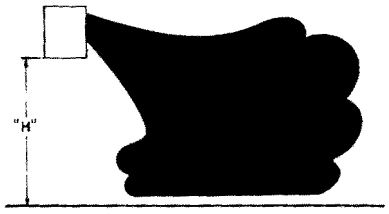


Table GD-2 – Standard Unit Heater Approximate Distance of Throw at Nominal Airflow

Distance From Floor to Bottom of Unit “H” ft./(m)	Unit Size – Input MBh – (kW)													
	30 (8.8)	45 (13.2)	60 (17.6)	75 (22.0)	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	33 (10.1)	33 (10.1)	33 (10.1)	40 (12.2)	60 (18.3)	65 (19.8)	70 (21.3)	75 (22.9)	80 (24.4)	85 (25.9)	90 (27.4)	105 (32.0)	110 (33.5)	120 (36.6)
10 (3.0)	28 (8.5)	28 (8.5)	28 (8.5)	35 (10.7)	54 (16.5)	56 (17.1)	60 (18.3)	64 (19.5)	68 (20.7)	72 (21.9)	78 (23.8)	90 (27.4)	95 (29.0)	100 (30.5)
12 (3.7)	NR	NR	NR	NR	44 (13.4)	46 (14.0)	49 (14.9)	57 (17.4)	61 (18.6)	65 (19.8)	68 (20.7)	80 (24.4)	84 (25.6)	90 (27.4)
15 (4.6)	NR	NR	NR	NR	NR	NR	45 (13.7)	49 (14.9)	52 (15.8)	56 (17.1)	60 (18.3)	70 (21.3)	74 (22.6)	80 (24.4)
20 (6.1)	NR	NR	NR	NR	NR	NR	NR	NR	46 (14.0)	50 (15.2)	54 (16.5)	63 (19.2)	66 (20.1)	70 (21.3)

30° Nozzle

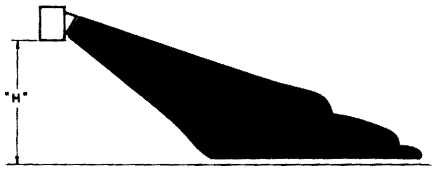


Table GD-3 – 30 Degree Nozzle – Approximate Distance of Throw at Nominal Airflow

Distance From Floor to Bottom of Unit “H” ft./(m)	Unit Size – Input MBh – (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	65 (19.8)	70 (21.3)	75 (22.9)	80 (24.4)	85 (25.9)	90 (27.4)	95 (29.0)	115 (35.1)	120 (36.6)	125 (38.1)
10 (3.0)	57 (17.4)	60 (18.3)	64 (19.5)	68 (20.7)	72 (21.9)	78 (23.8)	86 (26.2)	99 (30.2)	105 (32.0)	110 (33.5)
12 (3.7)	50 (15.2)	54 (16.5)	57 (17.4)	60 (18.3)	64 (19.5)	70 (21.3)	77 (23.5)	88 (26.8)	94 (28.7)	100 (30.5)
15 (4.6)	NR	45 (13.7)	48 (14.6)	50 (15.2)	53 (16.2)	59 (18.0)	64 (19.5)	74 (22.6)	79 (24.1)	84 (25.6)
20 (6.1)	NR	NR	NR	44 (13.4)	47 (14.3)	53 (16.2)	58 (17.7)	66 (20.1)	71 (21.6)	75 (22.9)

NR = Not Recommended

Notes:

1. All throw data figures are approximate.
2. NR = not recommended at these mounting heights.
3. Nozzles are not available on units below size 100 MBh.
4. Nozzles are available for High Efficiency units. Specify High Efficiency when ordering due to difference in nozzle configuration.

General Data

60° Nozzle

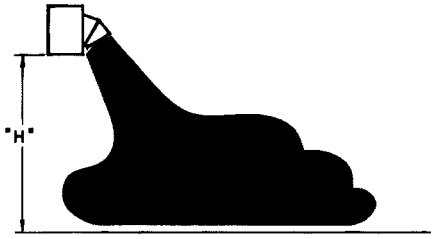


Table GD-4 – 60 Degree Nozzle – Approximate Distance of Throw at Nominal Airflow

Distance From Floor to Bottom of Unit "H" ft./(m)	Unit Size – Input MBh – (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	75 (22.9)	80 (24.4)	85 (25.9)	90 (27.4)	95 (29.0)	100 (30.5)	110 (33.5)	125 (38.1)	130 (39.6)	138 (42.1)
10 (3.0)	65 (19.8)	70 (21.3)	75 (22.9)	79 (24.1)	83 (25.3)	88 (26.8)	95 (29.0)	109 (33.2)	115 (35.1)	120 (36.6)
12 (3.7)	60 (18.3)	64 (19.8)	68 (20.7)	72 (21.9)	76 (23.2)	80 (24.4)	84 (25.6)	100 (30.5)	103 (31.4)	108 (32.9)
15 (4.6)	50 (15.2)	54 (16.5)	56 (17.1)	61 (18.6)	65 (19.8)	68 (20.7)	71 (21.6)	85 (25.9)	88 (26.8)	94 (28.7)
20 (6.1)	NR	49 (14.9)	52 (15.8)	55 (16.8)	59 (18.0)	61 (18.6)	65 (19.8)	77 (23.5)	81 (24.7)	85 (25.9)

90° Nozzle

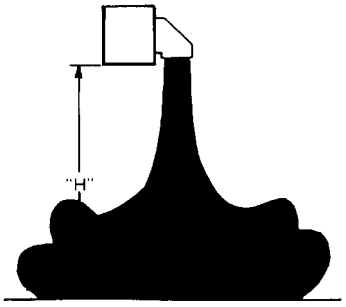


Table GD-5 – 90 Degree Nozzles – Approximate Floor Coverage at Nominal Airflow

Unit Size	Distance From Floor to Bottom of Unit "H" – ft./(m)				
	10' (3.0)	15' (4.6)	20' (6.1)	25' (7.6)	30' (9.1)
100	NR	30 x 25 (9.1 x 7.6)	NR	NR	NR
125	NR	35 x 30 (10.7 x 9.1)	NR	NR	NR
150	NR	40 x 35 (12.2 x 10.7)	NR	NR	NR
175	NR	45 x 40 (13.7 x 12.2)	NR	NR	NR
200	NR	50 x 40 (15.2 x 12.2)	40 x 35 (12.2 x 10.7)	NR	NR
225	NR	55 x 40 (16.8 x 12.2)	48 x 35 (14.6 x 10.7)	NR	NR
250	NR	60 x 45 (18.3 x 13.7)	56 x 40 (17.1 x 12.2)	50 x 35 (15.2 x 10.7)	NR
300	NR	70 x 45 (21.3 x 13.7)	65 x 40 (19.8 x 12.2)	60 x 35 (18.3 x 10.7)	55 x 35 (16.8 x 10.7)
350	NR	80 x 50 (24.4 x 15.2)	70 x 45 (21.3 x 13.7)	65 x 40 (19.8 x 12.2)	60 x 35 (18.3 x 10.7)
400	NR	100 x 50 (30.5 x 15.2)	80 x 45 (24.4 x 13.7)	75 x 40 (22.9 x 12.2)	65 x 40 (19.8 x 12.2)

"Y" Splitter

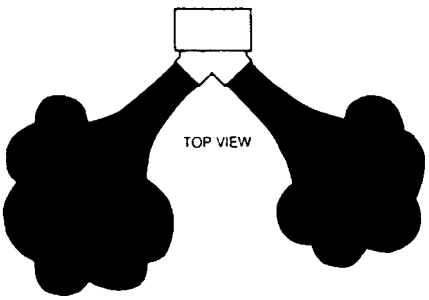


Table GD-6 – "Y" Splitters – Approximate Distance of Throw at Nominal Airflow

Distance From Floor to Bottom of Unit "H" ft./(m)	Unit Size – Input MBh – (kW)									
	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (87.8)	350 (102.5)	400 (117.1)
8 (2.4)	47 (14.3)	51 (15.5)	60 (18.3)	65 (19.8)	70 (21.3)	72 (21.9)	80 (24.4)	95 (29.0)	100 (30.5)	103 (31.4)
10 (3.0)	41 (12.5)	44 (13.4)	52 (15.8)	56 (17.1)	61 (18.6)	63 (19.2)	69 (21.0)	82 (25.0)	87 (26.5)	92 (28.0)
12 (3.7)	37 (11.3)	40 (12.2)	47 (14.3)	51 (15.5)	55 (16.8)	57 (17.4)	63 (19.2)	75 (22.9)	79 (24.1)	82 (25.0)

NR = Not Recommended

Notes:

1. All throw data figures are approximate.
2. NR = not recommended at these mounting heights.
3. Nozzles are not available on units below size 100 MBh.
4. Nozzles are available for High Efficiency units. Specify High Efficiency when ordering due to difference in nozzle configuration.

Performance Data

Table PD-1 – High Efficiency Propeller Fan Gas Unit Heater Performance Data

Model	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD
Unit Size	003	004	006	007	010	012	015	017	020	022	025	030	035	040
Input														
MBh	30	45	60	75	100	125	150	175	200	225	250	300	350	400
(kW)	8.8	13.2	17.6	22.0	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output														
MBh	24	36	42	60	80	100	120	140	160	120	200	240	280	320
(kW)	7.0	10.5	14.1	17.6	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery														
cfm	750	800	1,050	1,100	1,480	1,650	2,200	2,530	2,640	2,700	3,100	4,400	5,000	5,300
(cu. m/s)	0.354	0.378	0.496	0.519	0.699	0.779	1.038	1.194	1.246	1.274	1.463	2.077	2.360	2.502
Air Temperature Rise														
°F	30	42	42	50	50	56	50	51	56	61	60	50	52	56
°F	17	23	23	28	28	31	28	28	31	34	33	28	29	31
Outlet Velocity														
fpm	680	720	610	640	775	910	1,045	1,070	1,010	950	980	1,100	1,150	1,050
(m/s)	3.45	3.66	3.10	3.25	3.94	4.62	5.31	5.44	5.13	4.83	4.98	5.59	5.84	5.33
Full Load Amps at 115V	4.5	4.5	4.5	4.5	5.8	6	7.2	8.2	8.2	8.2	8.2	11.2	13.2	13.2
Motor Data:														
hp	1/30	1/30	1/30	1/30	1/20	1/10	1/4	1/3	1/3	1/3	1/3	(2)1/4	(2)1/3	(2)1/3
(kW)	0.025	0.025	0.025	0.025	0.037	0.075	0.186	0.249	0.249	0.249	0.249	(2) 0.186	(2) 0.249	(2) 0.249
Type	SP	SP	SP	SP	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
rpm	1,050	1,050	1,050	1,050	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Amps @ 115V	1.3	1.3	1.3	1.3	2.6	2.8	4.0	4.5	4.5	4.5	4.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard 115/60/1 open drip-proof motor.
3. Thermal efficiency for the 003 and 004 units are based on stack in horizontal position.
4. The flue vent fan motors used on all high efficiency units are 115/60/1; 1/20 hp and 1.5 amps.

Table PD-2 – High Efficiency Centrifugal Fan Unit Heater Performance Data

Model	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD
Unit Size	010	012	015	017	020	022	025	030	035	040
Input										
MBh	100	125	150	175	200	225	250	300	350	400
(kW)	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output										
MBh	80	100	120	140	160	180	200	240	280	320
(kW)	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery										
cfm	1,200	1,575	1,975	2,300	2,400	2,600	2,850	3,950	4,600	4,800
(cu. m/s)	0.566	0.743	0.932	1.086	1.133	1.227	1.345	1.864	2.171	2.266
Air Temperature Rise										
°F	62	59	56	56	62	64	65	56	56	62
°C	34	33	31	31	34	36	36	31	31	34
Outlet Velocity										
fpm	880	950	1,030	1,045	965	935	930	1,080	1,090	1,000
(m/s)	4.47	4.83	5.23	5.31	4.90	4.72	4.72	5.49	5.54	5.08
Full Load Amps at 115V	8.3	9.8	10.6	10.6	15.2	15.2	15.2	15.2	18.6	18.6
Motor Data :										
hp	¼	1/3	½	½	¾	¾	¾	¾	1	1
(kW)	0.19	0.25	0.37	0.37	0.56	0.56	0.56	0.56	0.75	0.75
Type	SHP	SHP	SHP	SHP	SHP	SHP	SHP	SHP	CS	CS
rpm	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725	1,725
Amps @ 115V	5.1	6.6	7.4	7.4	12.0	12.0	12.0	12.0	15.4	15.4

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motors are 115V 60 Hz, single phase open drip-proof.
3. The flue vent fan motors used on all high efficiency units are 115/60/1; 1/20 hp and 1.5 amps. All other voltages will require an additional transformer.
4. SPH= Split Phase; CS = Capacitor Start
5. 0.2" maximum external static pressure.

Table PAF-1 — Altitude Correction Factors

	Correction Factors For High Altitude Installations						
Altitude Above Sea Level (FT)	0	2,000	3,000	4,000	5,000	6,000	7,000
Gas Heating Capacity	1.00	0.92	0.88	0.84	0.80	0.76	0.72
Fan rpm	1.00	1.04	1.06	1.09	1.12	1.15	1.19
Fan bhp	1.00	1.07	1.12	1.18	1.25	1.33	1.41

Notes:
1. For high altitude installations above 2,000', reduce ratings 4% for each 1,000' above sea level.
2. Multiply standard unit by correction factor to get actual input and required rpm and hp.

Performance Data

Table PD-3 – Separated Combustion Propeller Fan Gas Unit Heater Performance Data

Model	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD
Unit Size	010	012	015	017	020	022	025	030	035	040
Input										
MBh	100	125	150	175	200	225	250	300	350	400
(kW)	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output										
MBh	80	100	120	140	160	180	200	240	280	320
(kW)	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery										
cfm	1480	1650	2200	2530	2640	2700	3100	4400	5000	5300
(cu. m/s)	0.699	0.779	1.038	1.194	1.246	1.274	1.463	2.077	2.360	2.502
Air Temperature Rise										
°F	50	56	50	51	56	61	60	50	52	56
°C	28	31	28	28	31	34	33	28	29	31
Outlet Velocity										
fpm	775	910	1045	1070	1000	950	980	1100	1150	1050
(m/s)	3.9	4.6	5.3	5.4	5.1	4.8	5.0	5.6	5.8	5.3
Full Load Amps at 115V	5.8	6.0	7.2	7.8	7.8	7.8	8.8	11.2	12.2	12.2
Motor Data:										
hp	1/20	1/10	1/4	1/3	1/3	1/3	1/2	(2) 1/4	(2) 1/3	(2) 1/3
(kW)	0.037	0.075	0.186	0.249	0.249	0.249	0.373	(2) 0.186	(2) 0.249	(2) 0.249
Type	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
rpm	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Amps @ 115V	2.6	2.8	4.0	4.5	4.5	4.5	5.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motor is 115/60/1 open drip-proof.
3. SP = Shaded Pole; PSC = Permanent Split Capacitor.

Table PD-4 – Separated Combustion Centrifugal Fan Gas Unit Heater Performance Data

Model	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD
Unit Size	010	012	015	017	020	022	025	030	035	040
Input										
MBh	100	125	150	175	200	225	250	300	350	400
(kW)	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output										
MBh	80	100	120	140	160	180	200	240	280	320
(kW)	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery										
cfm	1,200	1,575	1,975	2,300	2,400	2,600	2,850	3.950	4,600	4,800
(cu. m/s)	0.566	0.743	0.932	1.086	1.133	1.227	1.345	1.864	2.171	2.266
Air Temperature Rise										
°F	62	59	56	56	62	64	65	56	56	62
°C	34	33	31	31	34	36	36	31	31	34
Outlet Velocity										
fpm	880	950	1030	1045	965	935	930	1080	1090	1000
(m/s)	4.47	4.83	5.23	5.31	4.90	4.75	4.72	5.49	5.54	5.08
Full Load Amps at 115V	8.3	9.8	10.6	10.6	15.2	15.2	15.2	15.2	18.6	18.6
Motor Data:										
hp	¼	1/3	½	½	¾	¾	¾	¾	1	1
(kW)	0.19	0.25	0.37	0.37	0.56	0.56	0.56	0.56	0.75	0.75
Type	SPH	SPH	SPH	SPH	SPH	SPH	SPH	SPH	CS	CS
rpm	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
Amps @ 115V	5.1	6.6	7.4	7.4	12.0	12.0	12.0	12.0	15.4	15.4

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motor is 115/60/1 open drip-proof.
3. SPH = Split Phase; CS = Capacitor Start.

Performance Data

Table PD-5 – Propeller Fan Gas Unit Heater Performance Data

Model	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD
Unit Size	003	004	006	007	010	012	015	017	020	022	025	030	035	040
Input														
MBh	30	45	60	75	100	125	150	175	200	225	250	300	350	400
(kW)	8.8	13.2	17.6	22.0	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output														
MBh	24.3	36.5	48.6	60.8	80	100	120	140	160	180	200	240	280	320
(kW)	7.1	10.7	14.2	17.8	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	81%	81%	81%	81%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery														
cfm	700	800	1050	1100	1480	1650	2200	2530	2640	2700	3100	4400	5000	5300
(cu. m/s)	0.330	0.378	0.496	0.519	0.699	0.779	1.038	1.194	1.246	1.274	1.463	2.077	2.360	2.502
Air Temperature Rise														
°F	30	42	42	50	50	56	50	51	56	61	60	50	52	56
°C	17	23	23	28	28	31	28	28	31	34	33	28	29	31
Outlet Velocity														
fpm	700	750	640	672	950	900	1045	1070	1000	950	980	1100	1150	1050
(m/s)	3.6	3.8	3.3	3.4	4.8	4.6	5.3	5.4	5.1	4.8	5.0	5.6	5.8	5.3
Full Load Amps at 115V	2.1	2.1	2.1	2.1	3.4	3.6	4.8	5.8	5.8	5.8	5.8	8.8	10.8	10.8
Motor Data:														
hp	1/30	1/30	1/30	1/30	1/20	1/10	1/4	1/3	1/3	1/3	1/3	(2) 1/4	(2) 1/3	(2) 1/3
(kW)	0.025	0.025	0.025	0.025	0.037	0.075	0.186	0.249	0.249	0.249	0.249	(2) 0.186	(2) 0.249	(2) 0.249
Type	SP	SP	SP	SP	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
rpm	1,050	1,050	1,050	1,050	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Amps @ 115V	1.3	1.3	1.3	1.3	2.6	2.8	4.0	4.5	4.5	4.5	4.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. Standard motor is 115/60/1 open drip-proof.
3. SP = Shaded Pole; PSC = Permanent Split Capacitor
4. Unit amps are based on standing pilot units.

Table PD-6 – Tubular Heat Exchanger Performance Data

Model	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD	GTND/ GTPD
Unit Size	003	004	006	007	009	010	012	015	017	020	025	030	035	040
Input														
MBh	30	45	60	75	90	100	125	150	175	200	250	300	350	400
(kW)	8.8	13.2	17.6	22.0	26.4	29.3	36.6	43.9	51.2	58.6	73.2	87.8	102.5	117.1
Output														
MBh	24.3	36.5	48.6	60.8	72.9	81.0	101.3	121.5	141.8	162.0	202.5	243.0	283.5	324.0
(kW)	7.1	10.7	14.2	17.8	21.4	23.7	29.6	35.6	41.5	47.5	59.3	71.2	83.0	95.0
Thermal Efficiency	81	81	81	81	81	81	81	81	81	81	81	81	81	81
Free Air Delivery														
cfm	500	750	1,000	1,250	1,500	1,600	2,200	2,400	2,850	3,200	3,450	5,000	5,600	5,800
(cu m/s)	0.236	0.355	0.473	0.591	0.710	0.756	1.039	1.133	1.346	1.511	1.629	2.361	2.644	2.738
Air Temperature Rise														
°F	45	45	45	45	45	47	42	47	46	47	54	45	47	51
°C	25	25	25	25	25	26	23	26	26	26	30	25	26	28
Full Load Amps at 120V	4.9	4.9	5.6	5.6	5.6	6.6	8.0	7.8	8.3	8.3	8.3	12.5	12.5	12.5
Motor Data														
hp	1/20	1/20	1/20	1/20	1/20	1/10	1/4	1/4	1/3	1/3	1/3	1/4	1/3	1/3
(kW)	0.37	0.37	0.37	0.37	0.37	0.75	0.19	0.19	0.25	0.25	0.25	0.19	0.25	0.25
Type	SP	SP	SP	SP	SP	SP	PSC	PSC	PSC	PSC	PSC	PSC	PSC	PSC
rpm	1,650	1,650	1,050	1,050	1,050	1,050	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140
Amps at 115V	1.9	1.9	2.6	2.6	2.6	2.8	4.0	4.0	4.5	4.5	4.5	8.0	9.0	9.0

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. CS = Capacitor Start; SPH = Split Capacitor
3. Standard motors are 115/60/1 open drip-proof.
4. 0.2 maximum external static pressure.
5. Unit amps are based on hot surface pilot ignition.

Performance Data

Table PD-7 – Centrifugal Fan Gas Unit Heater 80% Thermal Efficiency Performance Data

Model	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD
Unit Size	010	012	015	017	020	022	025	030	035	040
Input										
MBh	100	125	150	175	200	225	250	300	350	400
(kW)	29.3	36.6	43.9	51.2	58.6	65.9	73.2	87.8	102.5	117.1
Output										
Btu	80	100	120	140	160	180	200	240	280	320
(kW)	23.4	29.3	35.1	41.0	46.9	52.7	58.6	70.3	82.0	93.7
Thermal Efficiency	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Free Air Delivery										
cfm	1,200	1,575	1,975	2,300	2,400	2,600	2,850	3,950	4,600	4,800
(cu. m/s)	0.566	0.743	0.932	1.086	1.133	1.227	1.345	1.864	2.171	2.266
Air Temperature Rise										
°F	62	59	56	56	62	64	65	56	56	62
°C	34	33	31	31	34	36	36	31	31	34
Outlet Velocity										
fpm	880	950	1030	1045	965	935	930	1080	1090	1000
(m/s)	4.47	4.83	5.23	5.31	4.90	4.75	4.72	5.49	5.54	5.08
Full Load Amps at 115V	5.9	7.4	8.2	8.2	12.8	12.8	12.8	12.8	16.2	16.2
Motor Data:										
hp	1/4	1/30	1/20	1/20	3/4	3/4	3/4	3/4	1	1
(kW)	0.19	0.25	0.37	0.37	0.56	0.56	0.56	0.56	0.75	0.75
Type	SPH	SPH	SPH	SPH	SPH	SPH	SPH	SPH	CS	CS
rpm	1725	1725	1725	1725	1725	1725	1725	1725	1725	1725
Amps @ 115V	5.1	6.6	7.4	7.4	12.0	12.0	12.0	12.0	15.4	15.4

Notes:
1. Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet, input must be derated 4 percent for each 1,000 feet above sea level.
2. CS = Capacitor Start; SPH = Split Capacitor
3. Standard motors are 115/60/1 open drip-proof.
4. Unit amps are based on standing pilot units.
5. 0.2" maximum external static pressure.

Table PD-8 – Indoor Gas Duct Furnace Performance Data – Standard or High Efficiency

Models GDND/GDPD/ GLND/GLPD Unit Size	Input MAX MBh (kW)	Input MIN MBh (kW)	Output MBh (Kw)	MIN. cfm (cu. m/s)	Temp. Rise °F (°C)	P.D. In. of H2O (kPa)	MAX. cfm (cu.m/s)	Temp. Rise °F (°C)	P.D. In. of H2O (Pascals)
010	100	50	80	929	80	0.12	2469	30	0.85
	29.3	14.6	23.4	0.438	44	0.03	1.165	17	0.21
012	125	62.5	100	1157	80	0.13	3086	30	0.85
	36.6	18.3	29.3	0.546	44	0.03	1.457	17	0.21
015	150	75	120	1389	80	0.15	3704	30	0.85
	43.9	22.0	35.1	0.656	44	0.04	1.748	17	0.21
017	175	87.5	140	1620	80	0.14	4321	30	0.85
	51.2	25.6	41.0	0.765	44	0.03	2.040	17	0.21
020	200	100	160	1852	80	0.14	4938	30	0.85
	58.6	29.3	46.9	0.874	44	0.03	2.331	17	0.21
022	225	112.5	180	2083	80	0.14	5556	30	0.85
	65.9	32.9	52.7	0.983	44	0.03	2.622	17	0.21
025	250	125	200	2315	80	0.14	6173	30	0.85
	73.2	36.6	58.6	1.093	44	0.03	2.914	17	0.21
030	300	150	240	2778	80	0.13	7407	30	0.87
	87.8	43.9	70.3	1.311	44	0.03	3.496	17	0.22
035	350	175	280	3241	80	0.13	8642	30	0.87
	102.5	51.2	82.0	1.530	44	0.03	4.079	17	0.22
040	400	200	320	3704	80	0.14	9877	30	0.90
	117.1	58.6	93.7	1.748	44	0.03	4.662	17	0.22

Note:
Ratings are shown for elevations up to 2,000 feet above sea level. Above 2,000 feet input must be derated four percent for each 1,000 feet above sea level.

Performance Data

Table PD-9 – Horizontal Blower Assembly Performance Data

Models	Nominal cfm	Blower Size	Water In. Kpa / cfm cu.m/s	External Static Pressure 0.2 0.05 rpm	hp kW	0.3 0.07 rpm	hp kW	0.4 0.10 rpm	hp kW	0.5 0.12 rpm	hp kW	0.6 0.15 rpm	hp kW	0.7 0.17 rpm	hp kW	0.8 0.20 rpm	hP kW	0.9 0.22 rpm	hp kW
			1,250 0.590	525	1/3 0.25	650	1/3 0.25	680	1/3 0.25	760	1/3 0.25	780	1/3 0.25	840	1/3 0.25	— Not Applicable —			
HBAC-15	1,500	10”	1,500 0.708	600	1/3 0.25	680	1/3 0.25	715	1/3 0.25	790	1/3 0.25	810	½ 0.37	860	½ 0.37	895	½ 0.37	970	½ 0.37
			1,750 0.826	650	1/3 0.25	710	1/3 0.25	750	½ 0.37	805	½ 0.37	850	½ 0.37	890	½ 0.37	940	¾ 0.56	990	¾ 0.56
			2,000 0.944	700	½ 0.37	760	½ 0.37	800	½ 0.37	850	½ 0.37	890	½ 0.37	925	¾ 0.56	980	¾ 0.56	1,010	¾ 0.56
			1,500 0.708	425	1/3 0.25	500	1/3 0.25	550	1/3 0.25	630	1/3 0.25	-	-	-	-	-	-	-	-
			1,750 0.826	450	1/3 0.25	515	1/3 0.25	560	1/3 0.25	635	½ 0.37	680	½ 0.37	725	½ 0.37	-	-	-	-
			2,000 0.944	475	1/3 0.25	530	1/3 0.25	590	½ 0.37	640	½ 0.37	690	½ 0.37	740	½ 0.37	785	½ 0.37	810	¾ 0.56
HBAC-20	2,000	12”	2,250 1.062	515	½ 0.37	560	½ 0.37	610	½ 0.37	650	½ 0.37	700	¾ 0.56	750	¾ 0.56	790	¾ 0.56	815	¾ 0.56
			2,500 1.180	540	½ 0.37	590	½ 0.37	625	½ 0.37	670	½ 0.37	710	¾ 0.56	760	¾ 0.56	795	¾ 0.56	820	¾ 0.56
			2,750 1.298	575	½ 0.37	615	½ 0.37	650	¾ 0.56	690	¾ 0.56	730	¾ 0.56	780	¾ 0.56	800	¾ 0.56	830	1 0.75
			1,750 0.826	450	1/3 0.25	510	1/3 0.25	560	1/3 0.25	630	1/3 0.25	675	½ 0.37	720	½ 0.37	-	-	-	-
			2,000 0.944	475	1/3 0.25	525	1/3 0.25	590	½ 0.37	635	½ 0.37	680	½ 0.37	735	½ 0.37	785	½ 0.37	810	¾ 0.56
			2,250 1.062	500	½ 0.37	550	½ 0.37	600	½ 0.37	645	½ 0.37	685	½ 0.37	740	¾ 0.56	785	¾ 0.56	810	¾ 0.56
HBAC-30	3,000	12”	2,500 1.180	525	½ 0.37	580	½ 0.37	615	½ 0.37	665	½ 0.37	700	¾ 0.56	750	¾ 0.56	790	¾ 0.56	815	¾ 0.56
			2,750 1.298	560	½ 0.37	605	½ 0.37	640	¾ 0.56	685	¾ 0.56	715	¾ 0.56	775	¾ 0.56	805	¾ 0.56	825	1 0.75
			3,000 1.416	610	½ 0.37	640	¾ 0.56	660	¾ 0.56	710	¾ 0.56	750	1 0.75	790	1 0.75	815	1 0.75	845	1 0.75
			3,250 1.534	630	¾ 0.56	675	¾ 0.56	700	1 0.75	735	1 0.75	750	1 0.75	790	1 0.75	830	1 0.75	860	1 0.75
			3,500 1.652	675	¾ 0.56	700	1 0.75	725	1 0.75	775	1 0.75	800	1 0.75	840	1½ 1.12	875	1½ 1.12	890	1½ 1.12
			2,750 1.298	400	¾ 0.56	450	¾ 0.56	510	¾ 0.56	-	-	-	-	-	-	-	-	-	-
			3,000 1.416	425	¾ 0.56	475	¾ 0.56	550	¾ 0.56	600	¾ 0.56	650	¾ 0.56	-	-	-	-	-	-
			3,500 1.652	430	¾ 0.56	480	¾ 0.56	560	¾ 0.56	610	¾ 0.56	660	¾ 0.56	700	1 0.75	730	1 0.75	-	-
			4,000 1.888	450	¾ 0.56	500	¾ 0.56	565	¾ 0.56	615	¾ 0.56	670	1 0.75	710	1 0.75	740	1 0.75	790	1 0.75
			4,500 2.124	475	¾ 0.56	525	¾ 0.56	575	¾ 0.56	620	1 0.75	680	1 0.75	715	1 0.75	750	1 0.75	800	1½ 1.12
			5,000 2.360	500	¾ 0.56	540	¾ 0.56	600	1 0.75	630	1 0.75	690	1 0.75	720	1½ 1.12	760	1½ 1.12	810	1½ 1.12
HBAC-45	4,500	12”	5,500 2.596	530	1 0.75	575	1 0.75	615	1 0.75	650	1½ 1.12	700	1½ 1.12	700	1½ 1.12	730	1½ 1.12	820	1½ 1.12
			6,000 2.832	575	1½ 1.12	615	1½ 1.12	660	1½ 1.12	690	1½ 1.12	715	1½ 1.12	760	2 1.49	800	2 1.49	830	2 1.49
			6,500 3.068	610	1½ 1.12	660	2 1.49	710	2 1.49	750	2 1.49	800	2 1.49	840	2 1.49	890	3 2.24	930	3 2.24
			7,000 3.304	720	1½ 1.12	790	2 1.49	830	2 1.49	860	2 1.49	910	3 2.24	940	3 2.24	960	3 2.24	NA	
			7,500 3.540	800	2 1.49	860	2 1.49	900	3 2.24	930	3 2.24	960	3 2.24	NA		NA		NA	
			8,000 3.776	860	2 1.49	930	3 2.24	960	3 2.24	NA		NA		NA		NA		NA	

*External Static Pressure in inches of water. Add pressure drop of indoor duct furnace, if used, to pressure drop of ductwork, to determine total external static pressure. HBAC units are for use with specific duct furnace sizes. Reference Table DW-13.

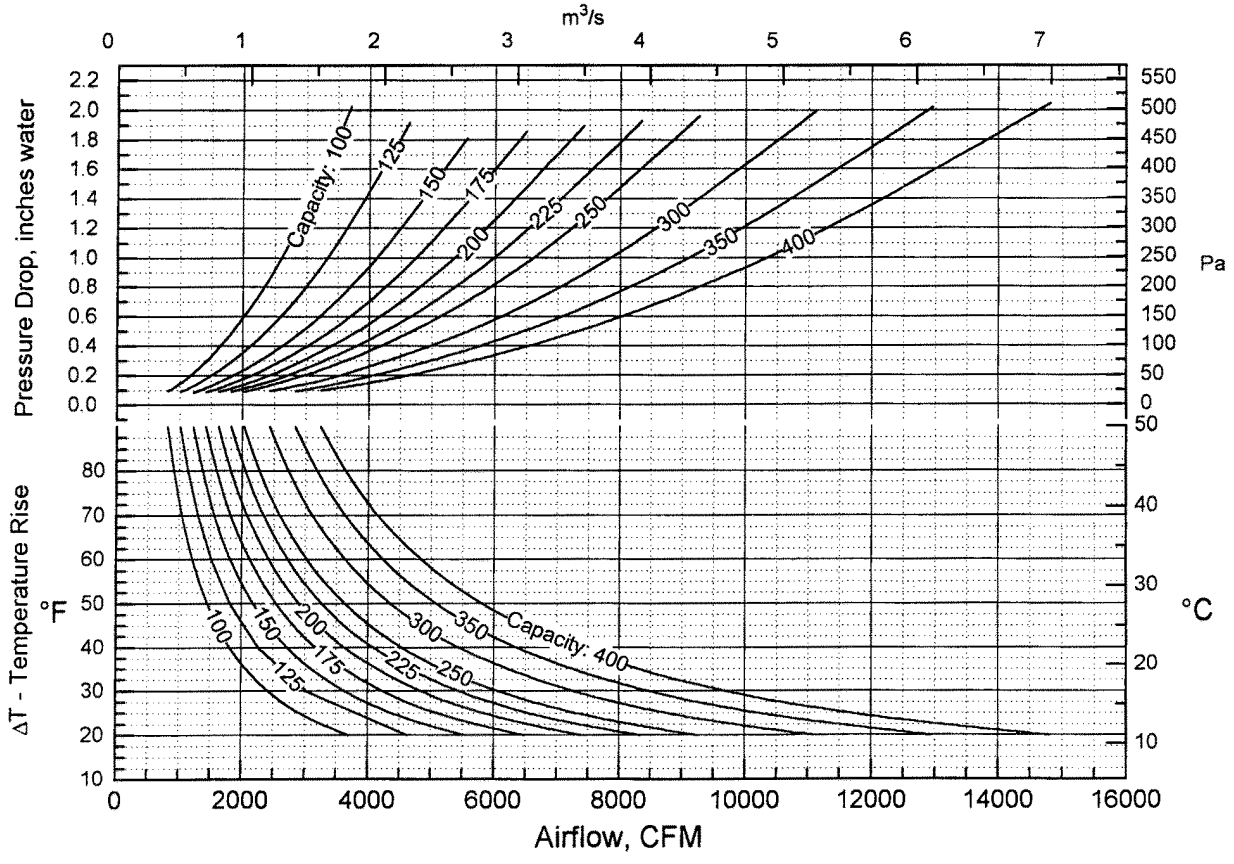
Performance Data

Table PD-10 – Separated Combustion Indoor Gas Duct Furnace

Models GMND/GMPD	Input (Max) MBh (kW)	Input (Min) MBh (kW)	Output MBh (kW)	Min. cfm (cu. m/s)	Temp. Rise °F (°C)	P.D. In. of H20 (kPa)	Max. cfm (cu.m/s)	Temp. Rise °F (°C)	P.D. in. of H20 (Pascals)
010	100 (29.3)	50 (14.6)	80 (23.4)	822 (0.388)	90 (50)	0.10 (0.02)	3700 (1.746)	20 (11)	2.03 (0.51)
012	125 (36.6)	62.5 (18.3)	100 (29.3)	1028 (0.485)	90 (50)	0.09 (0.02)	4625 (2.183)	20 (11)	1.92 (0.48)
015	150 (43.9)	75 (22.0)	120 (35.1)	1233 (0.582)	90 (50)	0.09 (0.02)	5550 (2.620)	20 (11)	1.81 (0.45)
017	175 (51.2)	875 (25.6)	140 (41.0)	1439 (0.679)	90 (50)	0.09 (0.02)	6475 (3.056)	20 (11)	1.86 (0.46)
020	200 (58.6)	100 (29.3)	160 (46.9)	1645 (0.776)	90 (50)	0.09 (0.02)	7401 (3.493)	20 (11)	1.90 (0.47)
022	225 (65.9)	112.5 (32.9)	180 (52.7)	1850 (0.873)	90 (50)	0.09 (0.02)	8326 (3.930)	20 (11)	1.93 (0.48)
025	250 (73.2)	125 (36.6)	200 (58.6)	2056 (0.970)	90 (50)	0.09 (0.02)	9251 (4.366)	20 (11)	1.96 (0.49)
030	300 (87.8)	150 (43.9)	240 (70.3)	2467 (1.164)	90 (50)	0.10 (0.02)	11101 (5.240)	20 (11)	2.00 (0.50)
035	350 (102.5)	175 (51.2)	280 (82.0)	2878 (1.358)	90 (50)	0.10 (0.02)	12951 (6.113)	20 (11)	2.02 (0.50)
040	400 (117.1)	200 (58.6)	320 (93.7)	3289 (1.552)	90 (50)	0.10 (0.02)	14801 (6.986)	20 (11)	2.05 (0.51)

Note:
Ratings are shown for elevations up to 2,000 feet (610m) above sea level. Above 2,000 feet (610m) input must be derated 4% for each 1,000 feet (305m) above sea level. When units are installed in Canada, any reference to derations at altitudes in excess of 2,000 feet (610m) are to be ignored. At altitudes of 2,000 to 4,500 (610 to 1372m), the units must be orificed to 90% of the normal altitude rating, and be so marked in accordance with the CGA certification.

Chart PD-1 – Performance Data Curves for all Duct Furnaces



Controls

Pilot Control

Standing pilot is standard on indoor duct furnaces, propeller fan unit heaters and centrifugal fan unit heaters. High efficiency units (centrifugal, propeller and duct furnaces) ship as standard with intermittent pilot ignition. The separated combustion propeller and centrifugal fan unit heaters also ship as standard with intermittent pilot ignition.

Intermittent pilot ignition contains a solid-state ignition control system that ignites the pilot by spark for each cycle of operation. When the pilot flame is proven, the main burner valve opens to allow gas flow to the burners. Both the pilot and burners are extinguished during the off cycle.

Intermittent pilot ignition is ideal for limited access installations where manual lighting of the pilot may be difficult. Nuisance pilot outages on units mounted in areas subject to occasional severe drafts can also be eliminated. Energy savings will be realized using this system as the pilot is extinguished during the off cycle. Intermittent pilot ignition should be considered on units that have long shutoff periods.
(Required on shipments to California.)

Fan Control

The supply fan motor is activated directly through the fan time delay relay on indoor units provided with single-phase motors up to one hp. Contactors or starters are required on all other units with single-phase motors 1½-hp and above, and with all three-phase motors. On indoor units, contactors and starters, where required, are provided. (See table below.)

Gas Controls

Single-Stage Control

Indoor gas heating units are provided with an automatic single-stage gas valve as standard. This valve is an on/off type control, typically activated by a low voltage single-stage thermostat.

Two-Stage Control

Indoor units with optional two-stage control are provided with a two-stage gas valve capable of firing at 100 percent and 50 percent of rated input. Ignition is at low fire (50 percent of the unit's rated input) and the unit is typically controlled by a low voltage two-stage thermostat.

Hydraulic Modulating Control

Units with optional hydraulic modulating control are provided with a modulating gas valve capable of firing from 50 percent to 100 percent of rated input. Ignition is at low fire (50 percent of input). The hydraulic modulating valve is controlled by a sensing bulb located in the discharge airstream which modulates the gas input from 50 percent to 100 percent of rated input. The unit is also provided with an automatic electric valve in series with the hydraulic modulating valve, which typically cycles the unit in response to a low voltage single-stage thermostat. Units that do not utilize a thermostat will operate as a standing pilot unit. The ignitor will light the pilot. The pilot will remain on until power is disconnected from the units.

Hydraulic Modulating Control with Bypass

An additional electric valve is provided in parallel with the hydraulic modulating valve. The electric valve bypasses the gas flow around the hydraulic modulating valve, allowing full fire and overriding the modulating valve's sensing bulb control. The electric valve is activated by a low voltage single-stage thermostat. (Thermostat not included)
(N/A on 30-75 MBh units)

Electronic Modulating Control

This optional control is available for use with natural gas units only. Units with electronic modulating control are provided with an electronic modulating valve capable of firing from 100 percent to 50 percent of rated input. Ignition is at full fire (100 percent of unit's rated input). The electronic modulating valve is controlled by a room thermostat or a duct thermostat with remote setpoint adjustment which modulates the gas input from 100 percent to 50 percent of rated input. An optional override room thermostat is available for use with the duct thermostat. The override room thermostat allows full fire and overrides the duct thermostat when the room temperature falls below the override room thermostat's setpoint. (N/A on 30-75 MBh units)

Electronic Modulating — 4-20 mA/0-10 VDC Input

Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Voltage	½ hp	¾hp	1hp	1½hp	2hp	3hp	5hp	7½hp	10hp
115/60/1	1	1	1	2	2	N/A	N/A	N/A	N/A
230/60/1	1	1	1	2	2	N/A	N/A	N/A	N/A
208/60/3	2	2	2	2	2	2	2	4	4
230/60/3	2	2	2	2	2	2	2	4	4
460/60/3	3	3	3	3	3	3	3	5	5

Notes:
1. Contactors not required or provided on units with single phase motors up to one hp.
2. Provided with contactor with line voltage holding coil on all 1½ hp and above single-phase motors and on all 208 230V three-phase motors up to five hp.
3. Provided with contactor with low (24V) holding coil on all 460V three-phase motors up to five hp.
4. Provided with size 2 starter on all units with 7½ and 10 hp 208/230V three-phase motors.
5. Provided with size 1 starter on all units with 7½ and 10 hp 460V three-phase motors.

Controls

Electronic Modulating Room Thermostat (Included with Gas Control)

- Low Voltage (24V)
- 60 to 85 F Range
- 5 13/16" W 3 ¼" H 1 7/8" D
- Natural Gas Only

Electronic Modulating Duct Thermostat (Included with Gas Control)

- Low Voltage (24V)
- 55 to 90 F Range
- Sensor: 10-inch Probe
- Remote Temperature Selector: 4 ¼" W 4 ¼" H 1 7/8" D
- Duct Thermostat: 4 ¼" W 4 ¼" H 1 5/8" D
- Natural Gas Only

Electronic Modulating Override Room Thermostat for use with Duct Thermostats (Order No. 350-0015-05)

- Line Voltage (115V)
- 50 to 90 F Range
- 2 7/8" W 4 9/16" H 1 ¼" D
- Natural Gas Only

Thermostats Single-Stage Room Thermostat (Order No. 350-0015-01)

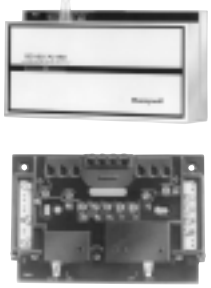
- Low Voltage (24V)
- 55 to 95 F Range
- 2 7/8" W x 4 ¾" H x 1 1/8" D

Single-Stage Room Thermostat with Summer/Winter Switch (Order No. 350-0015-02)

- Low Voltage (24V)
- 55 to 95 F Range
- Fan Auto-On Switch
- 3 ½" W x 4 1/5" H x 1 3/8" D

Two-Stage Room Thermostat (Order No. 350-0015-03)

- Low Voltage (24V)
- 42 to 88 F Range
- Fan Auto-On Switch
- System Off-Auto Switch
- 5 5/8" W x 3 ½" H x 2 1/8" D



Single-Stage Duct Thermostat (Order No. 350-0015-07)

- Low Voltage (24V)
- 55 to 175 F Range
- 5' Capillary
- 2" W x 5 5/8" H x 2 7/16" D

Two-Stage Duct Thermostat Order No. 350-0015-08)

- Low Voltage (24V)
- 55 to 175 F Range
- 5' Capillary
- 2" W x 5 5/8" H x 2 7/16" D

Universal Guard (Order No. 350-0015-06)

- Clear Plastic
- Ring Base
- Tumbler Lock and Two Keys
- Cover: 6 7/8" W x 5 5/8" H x 3"D
- Base: 6 9/16" W x 5 ½" H x 3/8" D

Electric Power

Sequence of Operation

Typical wiring diagrams and sequence of operations for indoor units with intermittent pilot ignition are shown below. On duct furnaces, the fan motor and associated controls shown in the wiring diagrams are not integral to the unit. It is essential, however, that the air handling system be interlocked with the duct furnace to prevent duct furnace operation without airflow.

Single-Stage Control

With power applied to the unit:

1
The thermostat calls for heat.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the main gas valve opens.

6
Main burners are lit at 100 percent of unit's rated input.

7
The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.*

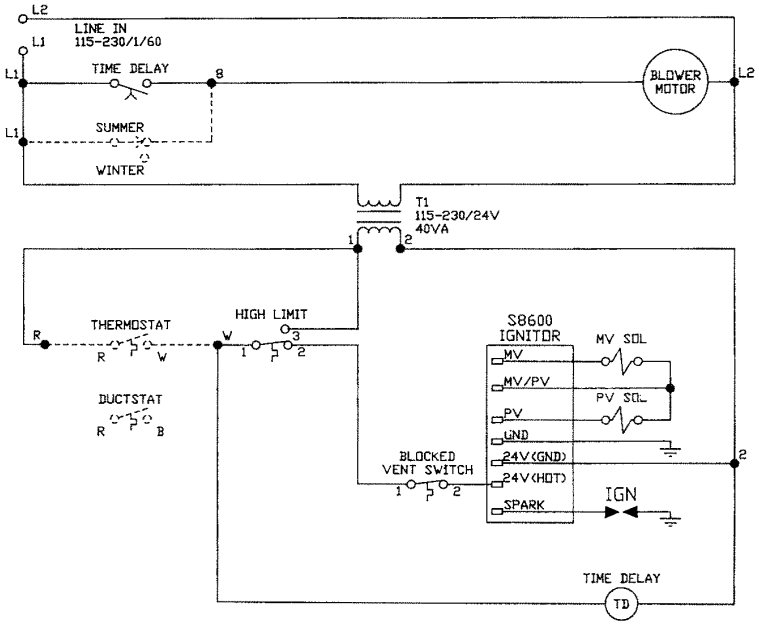
8
The unit continues to fire until the thermostat is satisfied and no longer calls for heat.

9
The main and pilot valves close.

10
The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

NOTE: This unit is equipped with a blocked vent shutoff (spill) switch. If the venting system becomes blocked or there is continuous spillage, the vent shutoff switch will shut off the unit heater.

*See Fan Controls on page 27.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

Electric Power

Two-Stage Control

With power applied to the unit:

1
The first stage of the thermostat calls for heat.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the main gas valve opens to low fire.

6
Main burners are lit at 50 percent of unit's rated input.

7
The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor*.

8
If additional heat is required, the second stage of the thermostat calls for heat.

9
The main gas valve opens to full fire. The main burners are now at full fire. The unit continues at full fire until the second stage of the thermostat is satisfied and no longer calls for heat.

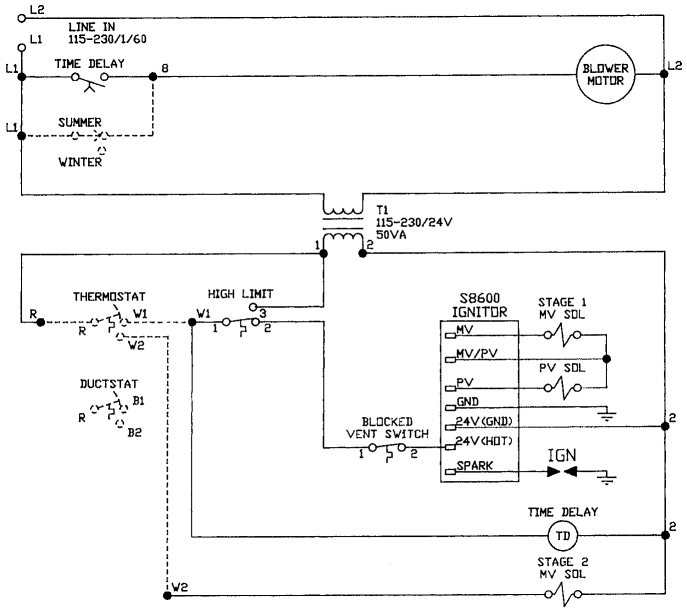
10
The main valve closes to low fire. The main burners are now at low fire. The unit continues at low fire until the first stage of the thermostat is satisfied and no longer calls for heat.

11
The main and pilot valves close.

12
The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

NOTE: This unit is equipped with a blocked vent shutoff (spill) switch. If the venting system becomes blocked or there is continuous spillage, the vent shutoff switch will shut off the unit heater.

*See Fan Controls on page 27.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Hi-limit and blocked vent (spill) wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

Electric Power

Hydraulic Modulating Control

With power applied to the unit:

1
The thermostat calls for heat. NOTE: If a thermostat is not supplied, steps 2 through 5 will be constant as long as power is applied to the unit.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the main electric gas valve opens. At this time, the fan time delay (optional on duct furnaces) is energized.The fan time delay relay closes and activates the fan motor.

NOTE:The unit firing is controlled by the hydraulic sensing bulb on the mechanical valve.The mechanically operated valve (not illustrated) is in series with the single-stage electrically operated valve.

6
The hydraulic sensing bulb, on the mechanical modulating valve, calls for heat.

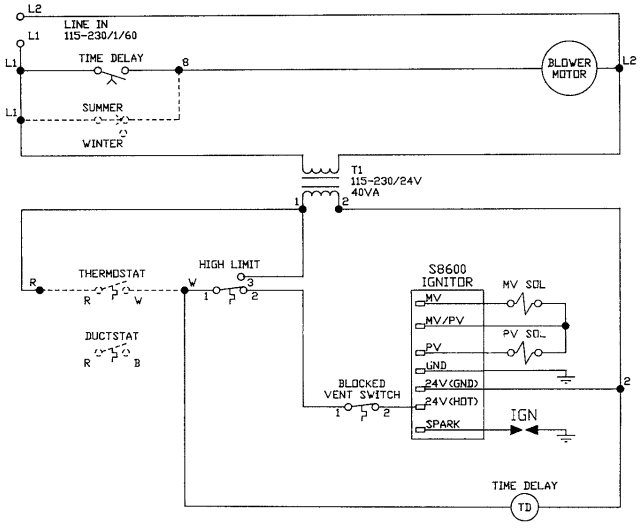
7
The mechanical modulating valve opens allowing gas flow to the main burners. Main burners are lit at 50 percent of the unit's rated input.The mechanical modulating valve modulates between 50 percent and 100 percent of firing rate depending on the temperature rise required.

8
The unit continues to fire until the hydraulic sensing bulb is satisfied and no longer calls for heat.

9
The mechanical modulating valve closes which shuts off the main gas supply to the burners.

10
The room thermostat is satisfied and no longer calls for heat.The main and pilot valves closes. At this time the fan time delay relay opens and deactivates the fan motor.

NOTE:This unit is equipped with a blocked vent shutoff (spill) switch. If the venting system becomes blocked or there is continuous spillage, the vent shutoff switch will shut off the unit heater.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Hi-limit and blocked vent (spill) wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

Electric Power

Sequence of Operation

Hydraulic Modulating Control

With Bypass

With power applied to the unit:

1
The thermostat calls for heat. NOTE: If a thermostat is not supplied, steps 2 through 5 will be constant as long as power is applied to the unit.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the main electric gas valve opens. At this time, the fan time delay (optional on duct furnaces) is energized.The fan time delay relay closes and activates the fan motor.

NOTE:The unit firing is controlled by the hydraulic sensing bulb on the mechanical valve.The mechanically operated valve (not illustrated) is in series with the single-stage electrically operated valve.

6
The unit is equipped with a bypass manifold containing a single-stage electric valve which is in parallel with the hydraulic modulating gas valve.The bypass is activated by a thermostat and overrides the hydraulic control.The override thermostat should be a remote room thermostat. If the temperature falls below the override thermostat's setpoint the thermostat opens the bypass valve, and the unit operates at full fire.The unit will continue at full fire until the override thermostat is satisfied and no longer calls for heat, at which point the bypass valve is closed.The unit is again controlled by the hydraulic sensing bulb on the mechanical valve.

7
The hydraulic sensing bulb on the mechanical valve calls for heat.

8
The mechanical modulating valve opens allowing gas flow to the main burners. Main burners are lit at 50 percent of the unit's rated input.The mechanical modulating valve modulates between 50 percent and 100 percent of firing rate, depending on the temperature rise required.

9
The unit continues to fire until the hydraulic sensing bulb is satisfied and no longer calls for heat.

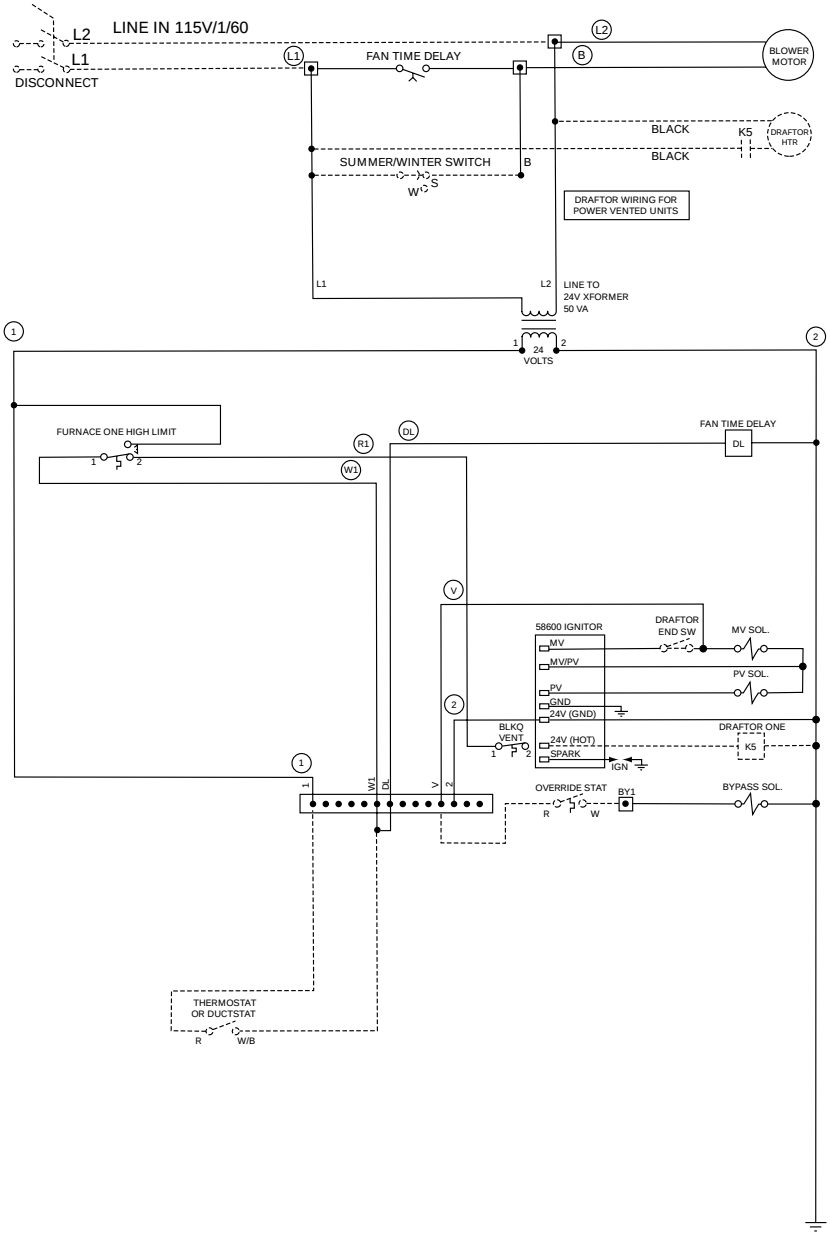
10
The mechanical modulating valve closes shutting off the main gas supply to the burners.

11
The room thermostat is satisfied and no longer calls for heat.The main and pilot valves closes. At this time the fan time delay relay opens and deactivates the fan motor.

Electric Power

Sequence of Operation

Hydraulic Modulating Control With Bypass



Electric Power

Sequence of Operation

Electronic Modulating Control

(with duct thermostat)

With power applied to the unit:

1
The thermostat calls for heat.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the gas valve opens.

6
Main burners are lit at 100 percent of unit's rated input.

7
The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.

8
The unit is controlled by the duct thermostat which modulates the unit from 100 to 50 percent of unit's rated input. An amplifier receives a small electrical signal from the thermostat and converts this into a working voltage. This working voltage determines the position of the modulating valve. With no voltage applied to the valve, the valve will be full open and full fire will occur. As increasing voltage is applied to the valve, the valve will modulate closed. At approximately 12V dc, the valve will be at its minimum low fire position. If the voltage continues to increase, indicating a further reduction in the unit's firing is required, the increased voltage closes a relay which closes the automatic gas valve. As temperature drops, the voltage also drops causing the relay to re-open the valve. The unit will continue to cycle in this manner until either an increase in the unit's firing rate is required or the thermostat is satisfied and no longer calls for heat.

9
When the thermostat is satisfied, the main and pilot valves close.

10
The fan time delay relay (optional on duct furnaces) remains closed keeping the fan motor operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

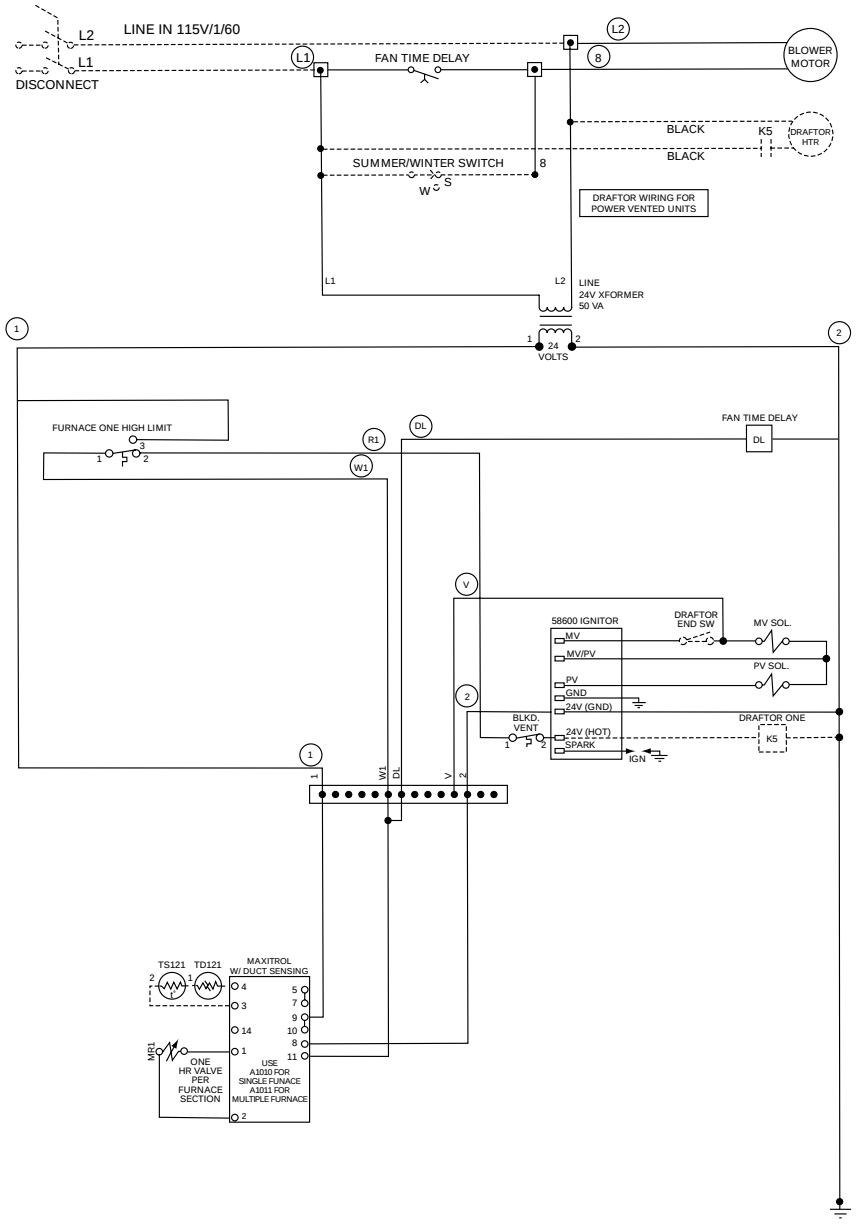
11
If optional room override thermostat is ordered…when setpoint is reached, it will cause the unit to go to full-fire, overriding both the duct sensor and the remote setpoint adjustment.

*****NOTE: Sensor and selector wires to amplifier must not be run close to, or in conduit with, power or ignition wires.***

Electric Power

Sequence of Operation

Electronic Modulating Control (with duct thermostat)



Electric Power

Sequence of Operation

Electronic Modulating Control (with room thermostat)

With power applied to the unit:

1
The thermostat calls for heat.

2
The pilot valve opens.

3
The ignitor sparks continuously to ignite the pilot.

4
The sensor proves pilot ignition and shuts off the ignitor.

5
With the pilot lit, the gas valve opens.

6
Main burners are lit at 100 percent of unit's rated input.

7
The fan time delay relay (optional on duct furnaces) allows the heat exchanger to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.

8
The unit is controlled by the electronic thermostat which modulates the unit from 100 to 50 percent of unit's rated input. An amplifier receives a small electrical signal from the thermostat and converts this into a working voltage.This working voltage determines the position of the modulating valve. With no voltage applied to the valve, the valve will be full open and full fire will occur. As increasing voltage is applied to the valve, the valve will modulate closed. At approximately 12V dc, the valve will be at its minimum low fire position. If the voltage continues to increase, indicating a further reduction in the unit's firing is required, the increased voltage closes a relay which closes the automatic gas valve. As temperature drops, the voltage also drops causing the relay to re-open the valve.The unit will continue to cycle in this manner until either an increase in the unit's firing rate is required or the thermostat is satisfied and no longer calls for heat.

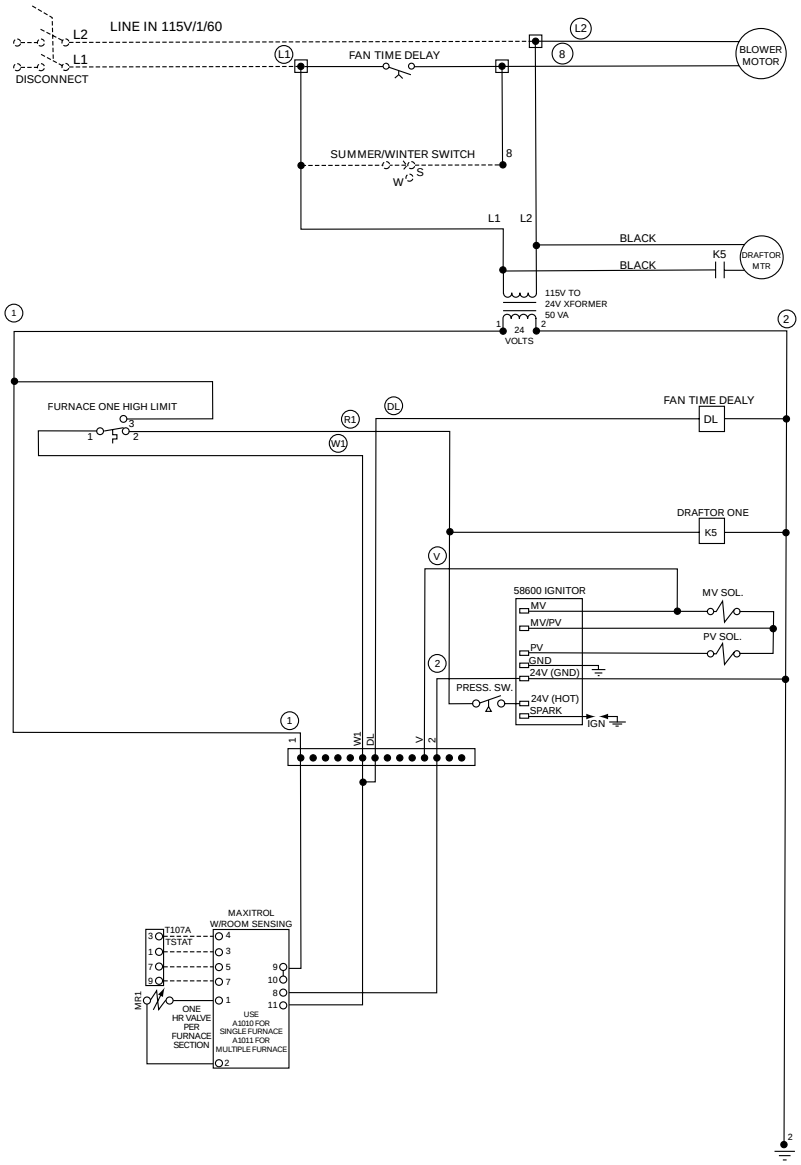
9
When the room thermostat is satisfied, the main and pilot valves close.

10
The fan time delay relay (optional on duct furnaces) remains closed keeping the fan motor operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.

Electric Power

Sequence of Operation

Electronic Modulating Control (with room thermostat)



Electric Power

High-Efficiency Units

NOTE: On duct furnaces, the fan motor and associated controls shown in the wiring diagrams are not integral to the unit. It is essential, however, that the air handling system be interlocked with the duct furnace to prevent duct furnace operation without airflow.

Single-Stage Control

With power applied to the unit:

1
The thermostat calls for heat.

2
The pressure switch measures the flow through the vent system and energizes the intermittent pilot when the flow is correct. CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING. If this procedure is not followed, there may be a gas buildup that could cause an explosion.

3
The pressure switch closes and activates the flue vent fan.

4
The pilot valve opens.

5
The ignitor sparks continuously to ignite the pilot.

6
The sensor proves pilot ignition and shuts off the ignitor.

7
With the pilot lit, the main gas valve opens.

8
Main burners are lit at 100 percent of the unit's rated input.

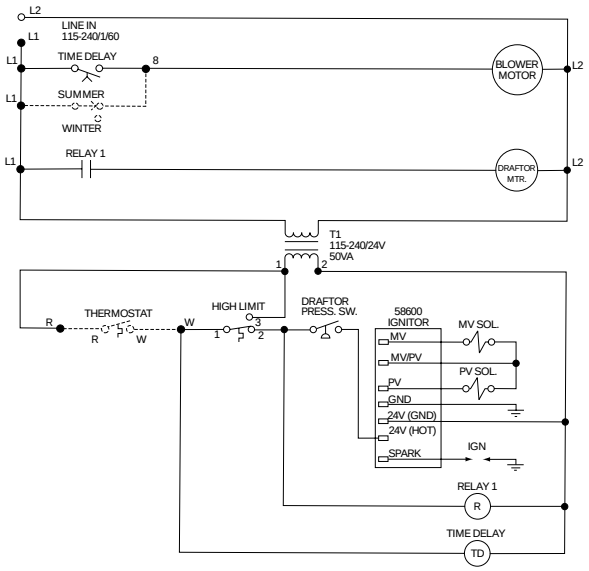
9
The fan time delay relay allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.

10
The unit continues to fire until the thermostat is satisfied and no longer calls for heat.

11
The main and pilot valve close.

12
The pressure switch opens and deactivates the flue vent fan.

13
The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Hi-limit and blocked vent (spill) wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

Electric Power

Separated Combustion Units

Single-Stage Control

With power applied to the unit:

1
The thermostat calls for heat.

2
The pressure switch measures the pressure differential between the air inlet and exhaust vent systems. If the differential is correct, the intermittent pilot ignition is energized. CAUTION: THE PRESSURE SWITCH MUST NOT BE BYPASSED. THE UNIT MUST NOT BE FIRED UNLESS THE FLUE VENT FAN IS OPERATING.

3
When the pressure switch is closed, the power venter motor is energized.

4
The pilot valve opens.

5
The ignitor sparks continuously to ignite the pilot.

6
The sensor proves pilot ignition and shuts off the ignitor.

7
With the pilot lit, the main gas valve opens.

8
Main burners are lit at 100 percent of the unit's rated input.

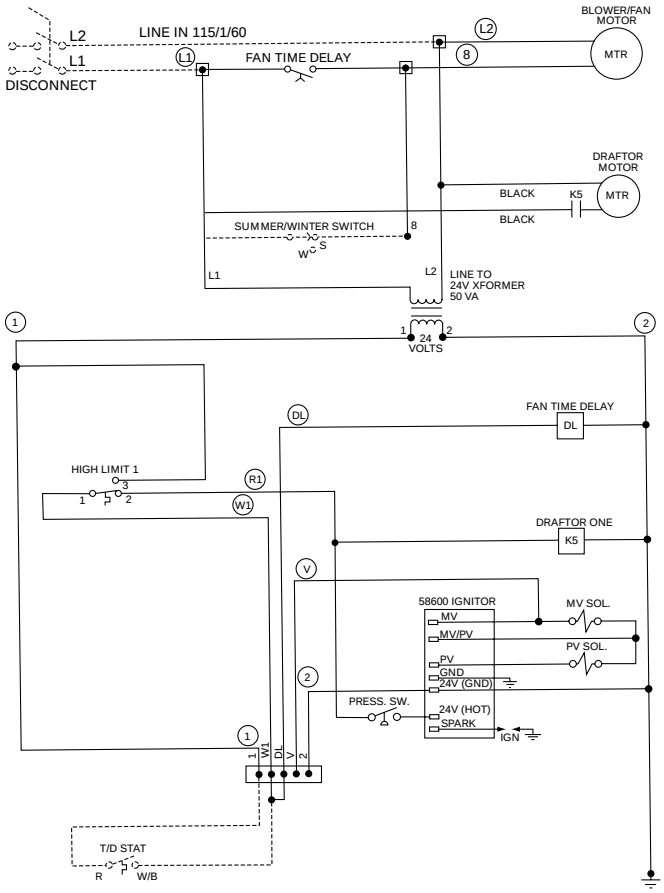
9
The fan time delay relay allows the heater to come up to operating temperature. At this time, the fan time delay relay closes and activates the fan motor.

10
The unit continues to fire until the thermostat is satisfied and no longer calls for heat.

11
The main and pilot valve close.

12
The pressure switch opens and deactivates the flue vent fan.

13
The fan time delay relay remains closed, keeping the fan operating to dissipate residual heat from the heat exchanger. At this time, the fan time delay relay opens and deactivates the fan motor.



- Caution - Disconnect power before servicing.
- Unit must be grounded.
- Use copper conductors only.
- If any of the original wire as supplied with the appliance must be replaced, it must be replaced with wiring material having a temperature rating of at least 125°C.
- Hi-limit and blocked vent (spill) wires minimum 200°C.
- Refer to installation instructions for venting, gas piping and start-up procedures.
- - - - Indicates Field Wiring.
- ___ Indicates Factory Wiring.

Electric Power

Separated Combustion Units

Single-Stage Control

Electronic Modulating 4-20 mA/0-10 VDC Input

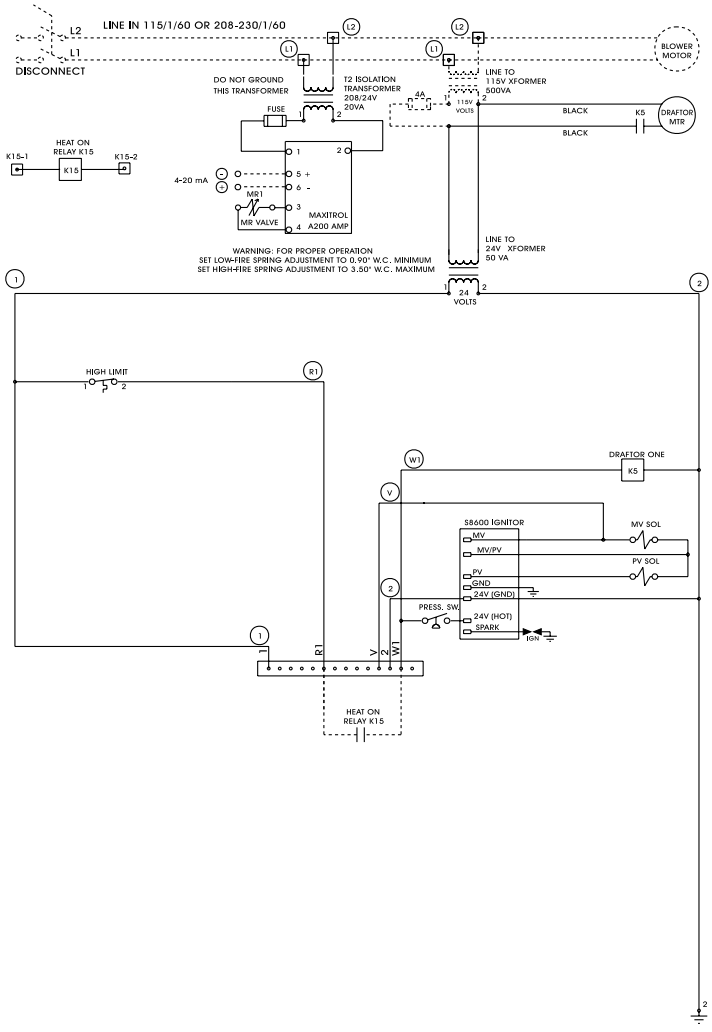


Table EP-1 — Motor Electrical Data — Centrifugal Fan

Current Characteristics	Full Load Amps*				
	¼hp	1/3hp	½hp	¾hp	1hp
115/60/1	5.0	5.9	7.2	11.0	14.0
230/60/1	2.5	3.3	3.9	5.5	7.0
208/60/3	NR	NR	2.7	3.1	4.0
230/60/3	NR	NR	2.4	2.8	3.6
460/60/3	NR	NR	1.2	1.4	1.8

*FLA based on NEC ratings. All motors are 1725 rpm.
NR = Motor available, but not rated by NEC.

Table EP-2 — Motor Electrical Data — Horizontal Blower

Current Characteristics	Full Load Amps*						
	½hp	½hp	¾hp	1hp	1½hp	2hp	3hp
115/60/1	5.9	7.2	11.0	14.0	16.4	24.6	34.0
230/60/1	3.3	3.9	5.5	7.0	8.2	12.3	17.0
208/60/3	NR	2.7	3.1	4.0	4.9	6.4	9.2
230/60/3	NR	2.4	2.8	3.6	4.4	5.8	8.6
460/60/3	NR	1.2	1.4	1.8	2.2	2.9	4.3
Motor wt. (LB)	18	33	33	36	39	40	44

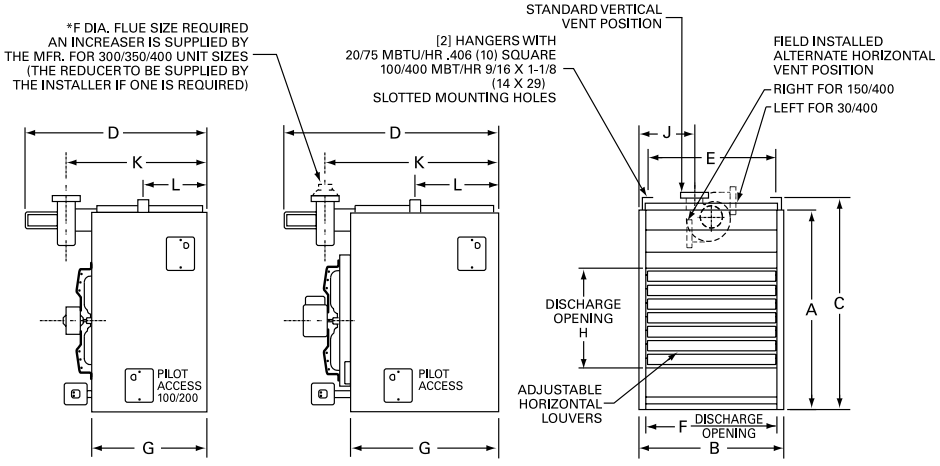
*FLA based on NEC ratings. All motors are 1,725 rpm.
NR = motor available, but not rated by NEC.

Dimension and Weights

Table DW-1 – High Efficiency Propeller Fan Gas Unit Heater Dimensional Data (in.) (mm)

Model	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD	GHND/ GHPD
Unit Sizes	30	45	60	75	100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit	25.75 (654)	25.75 (654)	25.75 (654)	25.75 (654)	31.25 (794)	31.25 (794)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)
"B" Width Of Unit	14 (356)	14 (356)	17.5 (445)	17.5 (445)	17.875 (454)	20.625 (524)	20.625 (524)	23.375 (594)	26.125 (664)	28.875 (733)	31.625 (803)	37.125 (943)	42.625 (1083)	48.125 (1222)
"C" Height to Top Of Hanger	27.5 (699)	27.5 (699)	27.5 (699)	27.5 (699)	34.125 (867)	34.125 (867)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)
"D" Depth to Rear Of Housing	30.375 (772)	30.375 (772)	30.375 (772)	30.375 (772)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)	37.5 (953)
"E" Hanging Distance Width	11 (279)	11 (279)	16.5 (419)	16.5 (419)	14.5 (368)	17.25 (438)	17.25 (438)	20 (508)	22.75 (578)	25.5 (648)	28.25 (718)	33.75 (857)	39.25 (997)	44.75 (1137)
"F" Discharge Opening Width	10 (254)	10 (254)	15.5 (394)	15.5 (394)	15.375 (391)	18.125 (460)	18.125 (460)	20.875 (530)	23.625 (600)	26.375 (670)	29.125 (740)	34.625 (879)	40.125 (1019)	45.625 (1159)
"G" Depth to Unit Side Jacket	19.375 (492)	19.375 (492)	19.375 (492)	19.375 (492)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)
"H" Discharge Opening Height	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)
"J" to Centerline Of Flue	4 (102)	4 (102)	5.75 (146)	5.75 (146)	5.872 (149)	7.25 (184)	7.25 (184)	8.625 (219)	10 (254)	11.25 (286)	12.75 (324)	15.5 (394)	18.25 (464)	21 (533)
"K" Depth to Centerline Of Flue	23.625 (600)	23.625 (600)	23.625 (600)	23.625 (600)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)	30.625 (778)
"L" Hanger Location	13.75 (349)	13.75 (349)	13.5 (343)	13.5 (343)	16.25 (413)	16.75 (425)	16.375 (416)	16.375 (416)	16.375 (416)	16.75 (425)	16.75 (425)	16.75 (425)	16.75 (425)	16.75 (425)
Flue Size Dia.-in.* (Dia.-mm)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	5 (127)	5 (127)	5 (127)	6 (152)	6 (152)	6 (152)
Fan Diameter in.	12	12	14	14	14	16	16	18	18	18	18	(2) 16	(2) 18	(2) 18
Gas Inlet-Natural Gas in.	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet- LP Gas in.	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt. (lb.)	79	94	109	119	174	197	219	238	249	275	305	350	414	461
(kg)	(36)	(43)	(49)	(54)	(79)	(89)	(99)	(108)	(113)	(125)	(138)	(159)	(188)	(209)

*The flue opening on all "GH" units is 5 1/8" diameter. Therefore a transition adapter is required by installer on these units.


*F DIA. FLUE SIZE REQUIRED AN INCREASER IS SUPPLIED BY THE MFR. FOR 300/350/400 UNIT SIZES (THE REDUCER TO BE SUPPLIED BY THE INSTALLER IF ONE IS REQUIRED)
[2] HANGERS WITH 20/75 MBTU/HR .406 (10) SQUARE 100/400 MBT/HR 9/16 X 1-1/8 (14 X 29) SLOTTED MOUNTING HOLES
STANDARD VERTICAL VENT POSITION
FIELD INSTALLED ALTERNATE HORIZONTAL VENT POSITION
RIGHT FOR 150/400
LEFT FOR 30/400
D
K
L
J
E
PILOT ACCESS 100/200
PILOT ACCESS
DISCHARGE OPENING H
ADJUSTABLE HORIZONTAL LOUVERS
A
C
F
DISCHARGE OPENING
G
B

Side View - 30 through 200 ***Side View - 225 through 400*** ***Front View - 30 through 400***

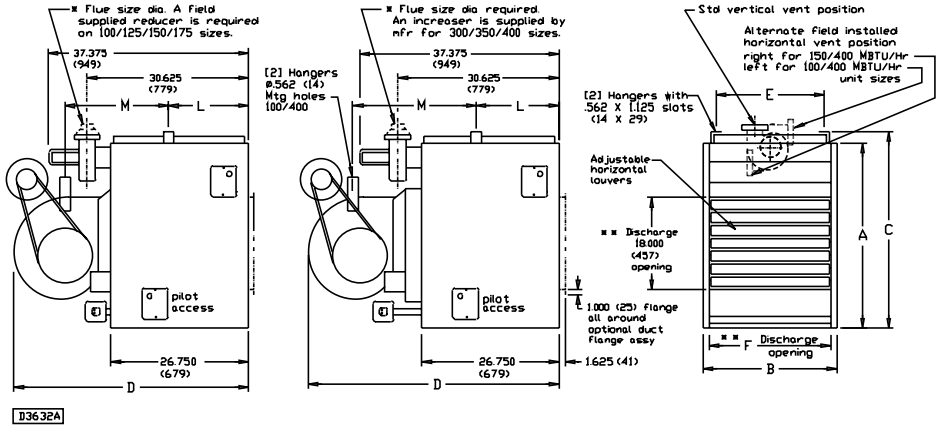
*Canadian units include vent cap and reducer/increaser (if required).
Dimensions in ( ) are in millimeters.

Dimension and Weights

Table DW-2 – High-Efficiency Centrifugal Fan Unit Heater Dimensional Data (in.) (mm)

Model	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD	GBND/ GBPD
Unit Size	100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit	31.25 (794)	31.25 (794)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)
"B" Width Of Unit	17.875 (454)	20.625 (524)	20.625 (524)	23.375 (594)	26.125 (664)	28.875 (733)	31.625 (803)	37.125 (943)	42.625 (1083)	48.125 (1222)
"C" Height to Top of Hanger	34.125 (867)	34.125 (867)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)
"D" Depth to Rear of Housing	42.625 (1083)	44.25 (1124)	44.25 (1124)	47 (1194)	47 (1194)	51 (1295)	51 (1295)	48.25 (1226)	51 (1295)	51 (1295)
"E" Hanging Distance Width	14.5 (368)	17.25 (438)	17.25 (438)	20 (508)	22.75 (578)	25.5 (648)	28.25 (718)	33.75 (857)	39.25 (997)	44.75 (1137)
"F" Discharge Opening Width	15.375 (391)	18.125 (460)	18.125 (460)	20.875 (530)	23.625 (600)	26.375 (670)	29.125 (740)	34.625 (879)	40.125 (1019)	45.625 (1159)
"J" To Centerline Of Flue	5.875 (149)	7.25 (184)	7.25 (184)	8.625 (219)	10 (254)	11.25 (286)	12.75 (324)	15.5 (394)	18.25 (464)	21 (533)
"L" Hanger Location	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)	16.375 (416)
"M" Hanging Distance Depth	16.375 (416)	16.375 (416)	16.375 (416)	17.875 (454)	17.875 (454)	21.875 (556)	21.875 (556)	21.875 (556)	21.875 (556)	21.875 (556)
Flue Size (Dia-in.) * (Dia-mm)	4 (102)	4 (102)	4 (102)	4 (102)	5 (127)	5 (127)	5 (127)	6 (152)	6 (152)	6 (152)
Blower Size (in.)	9	10	10	12	12	12	12	(2) 10	(2) 12	(2) 12
Gas Inlet-Natural Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet- LP Gas (in.)	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt. (lb.) (kg)	262 (119)	279 (127)	314 (142)	336 (152)	363 (165)	408 (185)	427 (194)	471 (214)	561 (254)	594 (269)

*The flue opening on all "GB" units is 5 1/8" diameter. Therefore a transition adapter is required by installer on these units.



Side View - 100 through 200 ***Side View - 225 through 400*** ***Front View - 100 through 400***

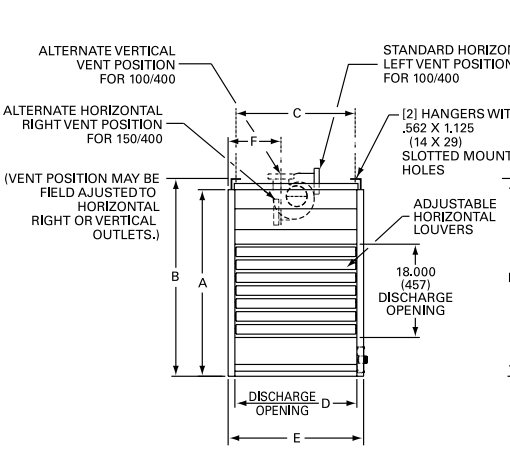
*Canadian units include vent cap and reducer/increaser (if required).
Dimensions in ( ) are in millimeters.

Dimension and Weights

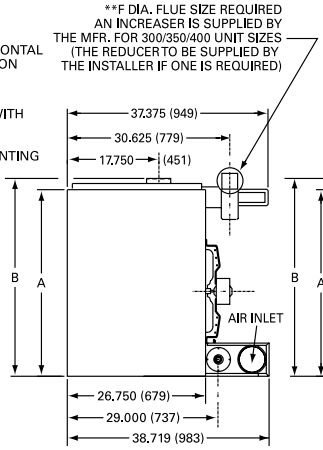
Table DW-3 – Separated Combustion – Propeller Fan Gas Unit Heater Dimensional Data (in.) (mm)

Model	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD	GAND/ GAPD
Unit Size	100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit	31.25 (794)	31.25 (794)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)
"B" Height to Top of Hanger	34.062 (865)	34.062 (865)	39.062 (992)	39.062 (992)	39.062 (992)	39.062 (992)	39.062 (992)	39.062 (992)	39.062 (992)	39.062 (992)
"C" Hanging Distance Width	14.75 (375)	17.5 (445)	17.5 (445)	20.25 (514)	23 (584)	25.75 (654)	28.5 (724)	34 (864)	39.5 (1003)	45 (1143)
"D" Discharge Opening Width	15.375 (391)	18.125 (460)	18.125 (460)	20.875 (530)	23.625 (600)	26.375 (670)	29.125 (740)	34.625 (879)	40.125 (1019)	45.625 (1159)
"E" Width Of Unit	17.875 (454)	20.625 (524)	20.625 (524)	23.375 (594)	26.125 (664)	28.875 (733)	31.625 (803)	37.125 (943)	42.625 (1083)	48.125 (1222)
"F" To Centerline Of Flue	5.875 (149)	7.25 (184)	7.25 (184)	8.625 (219)	10 (254)	11.25 (286)	12.75 (324)	15.5 (394)	18.25 (464)	21 (533)
Flue Size Dia.-in. (Dia.-mm)	4 (102)	4 (102)	4 (102)	4 (102)	5 (127)	5 (127)	5 (127)	6 (152)	6 (152)	6 (152)
Fan Diameter (in.)	14	16	16	18	18	18	18	(2)16	(2)18	(2)18
Gas Inlet-Natural Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet- LP Gas (in.)	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt. (lb.) (kg)	200 (91)	228 (103)	256 (116)	284 (129)	312 (142)	340 (154)	368 (167)	432 (196)	488 (221)	545 (247)

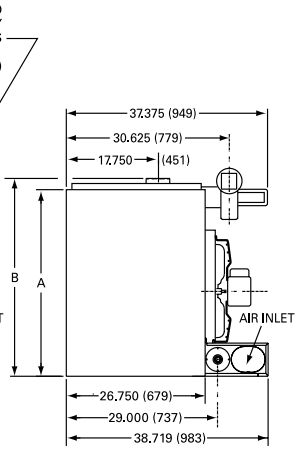
*The flue openings on all units are 5 ⅛" diameter. Therefore, a transition adapter is required by installer on these units.


ALTERNATE VERTICAL VENT POSITION FOR 100/400
STANDARD HORIZONTAL LEFT VENT POSITION FOR 100/400
ALTERNATE HORIZONTAL RIGHT VENT POSITION FOR 150/400
(VENT POSITION MAY BE FIELD AJUSTED TO HORIZONTAL RIGHT OR VERTICAL OUTLETS.)
C
F
[2] HANGERS WITH .562 X 1.125 (14 X 29) SLOTTED MOUNTING HOLES
ADJUSTABLE HORIZONTAL LOUVERS
18.000 (457) DISCHARGE OPENING
B
A
DISCHARGE OPENING
D
E

Front View - 100 through 400


**F DIA. FLUE SIZE REQUIRED AN INCREASER IS SUPPLIED BY THE MFR. FOR 300/350/400 UNIT SIZES (THE REDUCER TO BE SUPPLIED BY THE INSTALLER IF ONE IS REQUIRED)
37.375 (949)
30.625 (779)
17.750
(451)
B
A
AIR INLET
26.750 (679)
29.000 (737)
38.719 (983)

Side View - 100 through 200



Side View - 225 through 400

NOTE: Air intake is round on 225/ 250 units. For 300/400 units, air intake is as shown.

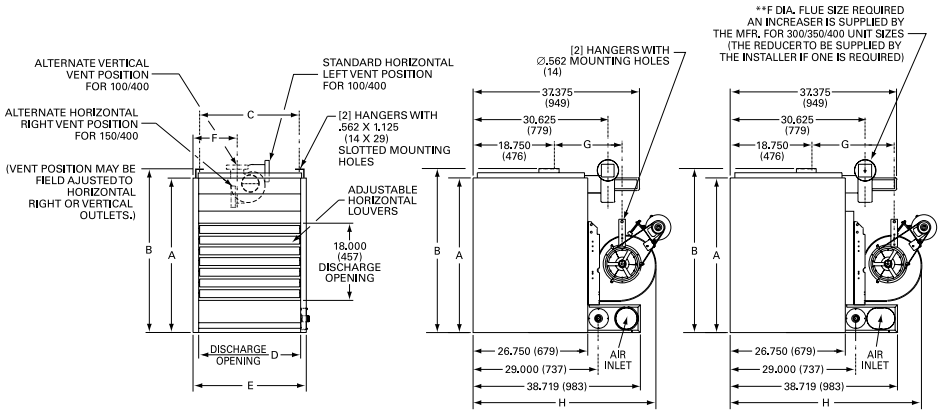
*Canadian units include vent cap and reducer/increaser (if required).
Dimensions in ( ) are in millimeters.

Dimension and Weights

Table DW-4 – Separated Combustion – Centrifugal Fan Unit Heater Dimensional Data

Model	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD	GKND/ GKPD
Unit Size	100	125	150	175	200	225	250	300	350	400
"A" Height to Top	31.25	31.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25	36.25
Top of Unit	(794)	(794)	(921)	(921)	(921)	(921)	(921)	(921)	(921)	(921)
"B" Height to Top	34.062	34.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062	39.062
Top of Hanger	(865)	(865)	(992)	(992)	(992)	(992)	(992)	(992)	(992)	(992)
"C" Hanging	14.75	17.5	17.5	20.25	23	25.75	28.5	34	39.5	45
Distance Width	(375)	(445)	(445)	(514)	(584)	(654)	(724)	(864)	(1003)	(1143)
"D" Discharge	15.375	18.125	18.125	20.875	23.625	26.375	29.125	34.625	40.125	45.625
Opening Width	(391)	(460)	(460)	(530)	(600)	(670)	(740)	(879)	(1019)	(1159)
"E" Width	17.875	20.625	20.625	23.375	26.125	28.875	31.625	37.125	42.625	48.125
Of Unit	(454)	(524)	(524)	(594)	(664)	(733)	(803)	(943)	(1083)	(1222)
"F" To Centerline	5.875	7.25	7.25	8.625	10	11.25	12.75	15.5	18.25	21
Of Flue	(149)	(184)	(184)	(219)	(254)	(286)	(324)	(394)	(464)	(533)
"G" Hanging	18.5	18.5	18.5	20	20	23	23	23	23	23
Distance Depth	(470)	(470)	(470)	(508)	(508)	(584)	(584)	(584)	(584)	(584)
"H" Depth to	42.75	44.375	44.375	47.187	47.187	50.875	48	50.875	50.875	51
Rear of Housing	(1086)	(1127)	(1127)	(1199)	(1199)	(1292)	(1219)	(1292)	(1292)	(1295)
Flue Size (Dia-in.)	4	4	4	4	5	5	5	6	6	6
(Dia-mm)	(102)	(102)	(102)	(102)	(127)	(127)	(127)	(152)	(152)	(152)
Blower Size (in)	9	10	10	12	12	12	12	(2) 10	(2) 12	(2) 12
Gas Inlet-Natural Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet- LP Gas (in.)	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt.										
(lb.)	298	330	362	394	426	458	490	558	618	678
(kg)	(135)	(150)	(164)	(179)	(193)	(208)	(222)	(253)	(280)	(308)

*The flue openings on all units are 5⅛" diameter. Therefore, a transition adaptor is required by installer on these units.


ALTERNATE VERTICAL VENT POSITION FOR 100/400
STANDARD HORIZONTAL LEFT VENT POSITION FOR 100/400
ALTERNATE HORIZONTAL RIGHT VENT POSITION FOR 150/400
[2] HANGERS WITH .562 X 1.125 (14 X 29) SLOTTED MOUNTING HOLES
(VENT POSITION MAY BE FIELD AJUSTED TO HORIZONTAL RIGHT OR VERTICAL OUTLETS.)
ADJUSTABLE HORIZONTAL LOUVERS
18.000 (457) DISCHARGE OPENING
DISCHARGE OPENING
C
F
B
A
D
E
[2] HANGERS WITH Ø.562 MOUNTING HOLES (14)
37.375 (949)
30.625 (779)
18.750 (476)
G
H
AIR INLET
26.750 (679)
29.000 (737)
38.719 (983)
**F DIA. FLUE SIZE REQUIRED AN INCREASER IS SUPPLIED BY THE MFR. FOR 300/350/400 UNIT SIZES (THE REDUCER TO BE SUPPLIED BY THE INSTALLER IF ONE IS REQUIRED)

Front View - 100 through 400 ***Side View - 100 through 200*** ***Side View - 225 through 400***

NOTE: Air intake is round on 225/250 units. For 300/400 units, air intake is as shown.

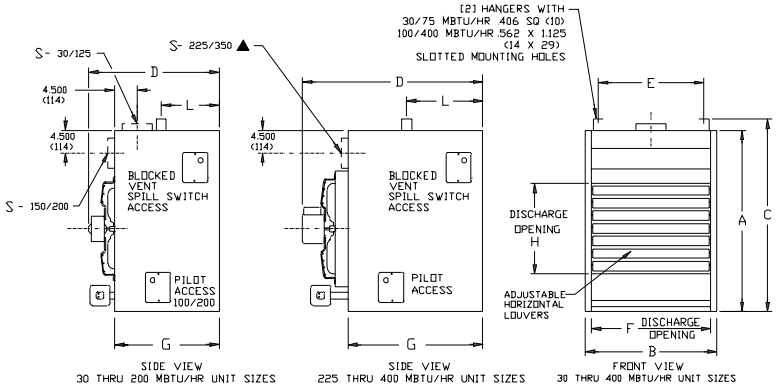
*Canadian units include vent cap and reducer/increaser (if required).
Dimensions in ( ) are in millimeters.

Dimension and Weights

Table DW-5 – Propeller Fan Gas Unit Heater Dimensional Data (in.) (mm)

Model	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD	GPND/ GPPD
Unit Size	30	45	60	75	100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit	25.75 (654)	25.75 (654)	25.75 (654)	25.75 (654)	31.25 (794)	31.25 (794)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)
"B" Width of Unit	14 (356)	14 (356)	17.5 (445)	17.5 (445)	17.875 (454)	20.625 (524)	20.625 (524)	23.375 (594)	26.125 (664)	28.875 (733)	31.625 (803)	37.125 (943)	42.625 (1083)	48.125 (1222)
"C" Height to Top of Hanger	27.5 (699)	27.5 (699)	27.5 (699)	27.5 (699)	33.25 (845)	33.25 (845)	38.25 (972)	38.25 (972)	38.25 (972)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)	39.125 (994)
"D" Depth to Rear of Housing	27.625 (702)	27.625 (702)	27.625 (702)	27.625 (702)	32.5 (826)	32.5 (826)	36 (914)	36 (914)	36 (914)	38.25 (972)	38.25 (972)	37.75 (959)	38.25 (972)	38.25 (972)
"E" Hanging Distance Width	8.625 (219)	8.625 (219)	14.125 (359)	14.125 (359)	14.75 (375)	17.5 (445)	17.5 (445)	20.25 (514)	23 (584)	25.5 (648)	28.25 (718)	33.75 (857)	39.25 (997)	44.75 (1137)
"F" Discharge Opening Width	10 (254)	10 (254)	15.5 (394)	15.5 (394)	15.375 (391)	18.125 (460)	18.125 (460)	20.875 (530)	23.6256 (600)	26.375 (670)	29.125 (740)	34.625 (879)	40.125 (1019)	45.625 (1159)
"G" Depth to Unit Side Jacket	19.375 (492)	19.375 (492)	19.375 (492)	19.375 (492)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)	26.75 (679)
"H" Discharge Opening Height	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)	18 (457)
"L" Hanger Location	11.875 (302)	11.875 (302)	11.5 (292)	11.5 (292)	15.125 (384)	15.125 (384)	15.125 (384)	15.125 (384)	15.125 (384)	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)
"S" Flue Size (Dia-in.) (Dia-mm)	4 (102)	4 (102)	5 (127)	5 (127)	6 (152)	6 (152)	7 (178)	7 (178)	8 (203)	8 (203)	8 (203)	10 (254)	10 (254)	12 (305)
Flue Type*	R,V	R,V	R,V	R,V	R,V	R,V	R,H	R,H	R,H	R,H	R,H	OV,H	OV,H	OV,#
Fan Diameter (in.)	12	12	14	14	14	16	16	18	18	18	18	(2) 16	(2) 18	(2) 18
Gas Inlet-Natural Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet- LP Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt. (lb.) (kg)	72 (33)	82 (37)	98 (44)	104 (47)	178 (81)	200 (91)	209 (95)	232 (105)	242 (110)	279 (127)	301 (137)	356 (161)	415 (188)	451 (205)
Net Unit wt. (lb.) (kg)	59 (27)	69 (31)	84 (38)	90 (41)	148 (67)	168 (76)	175 (79)	196 (89)	216 (98)	239 (108)	261 (118)	304 (138)	340 (154)	376 (171)

*R – Round, OV – Oval. Refer to detail above for 400 MBh unit.



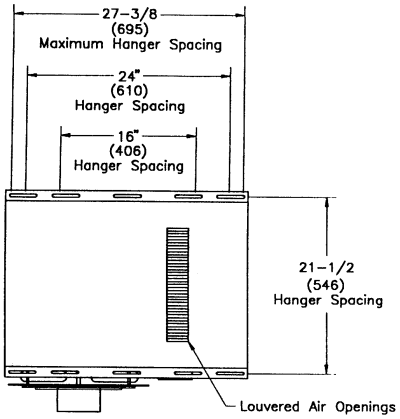
Side View - 30 through 200 ***Side View - 225 through 400*** ***Front View - 30 through 400***

Dimensions are in inches.
(Dimensions in parentheses are in mm.)

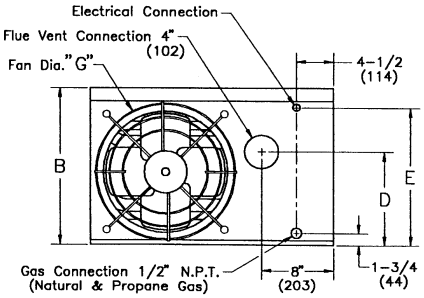
Dimension and Weights

Table DW-6 – Tubular Heat Exchanger Dimensional Data (in.) (mm)

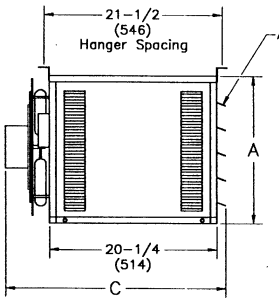
Model	GTND/GTPD	GTND/GTPD	GTND/GTPD	GTND/GTPD	GTND/GTPD
Unit Size	003	004	006	007	009
"A" Height to Top of Unit	12 (305)	12 (305)	17.75 (451)	17.75 (451)	17.75 (451)
"B" Height to Top of Hanger	13 (330)	13 (330)	18.75 (476)	18.75 (476)	18.75 (476)
"C" Overall Depth	25.5 (648)	25.5 (648)	26.75 (679)	26.75 (679)	26.75 (679)
Center Line Height of Flue	7.25 (184)	7.25 (184)	10.5 (267)	10.5 (267)	10.5 (267)
Center Line Electric Connection	10.25 (260)	10.25 (260)	16 (406)	16 (406)	16 (406)
" F" Discharge Opening Height	10.5 (267)	10.5 (267)	16.25 (413)	16.25 (413)	16.25 (413)
"G" Fan Diameter-in.	10	10	16	16	16
Unit Weight					
(lbs.)	62	68	87	93	93
(kgs.)	(28)	(31)	(39)	(42)	(42)
Shipping Weight					
(lbs.)	72	78	102	108	108
(kgs.)	(33)	(35)	(46)	(49)	(49)



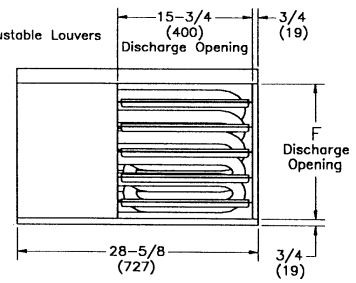
Top View



Rear View



Side View



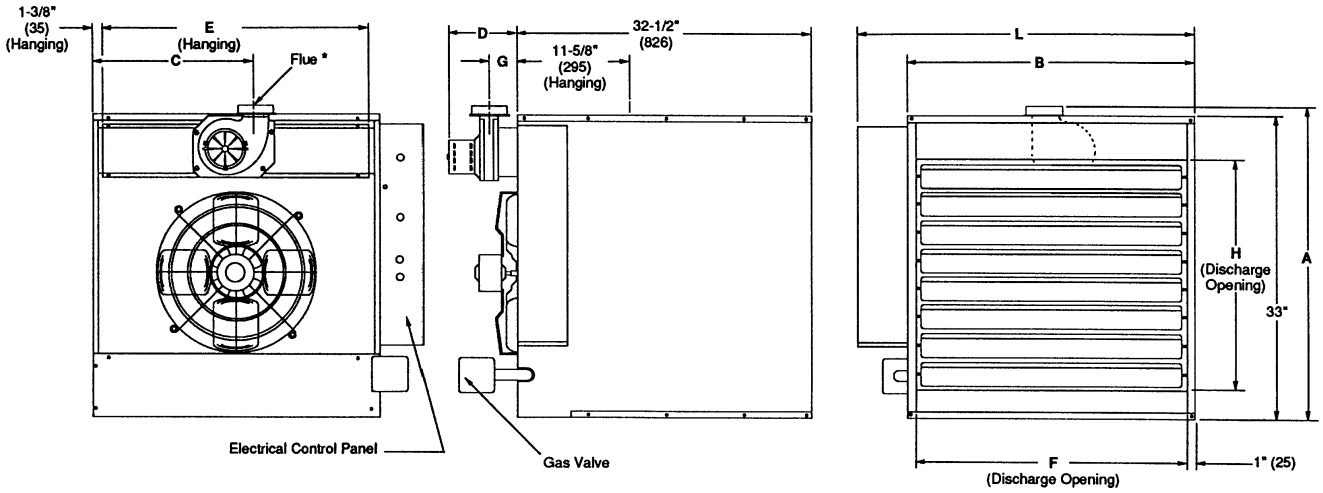
Front View

Dimensions are in inches.
(Dimensions in parentheses are in mm.)

Dimension and Weights

Table DW-7 – Tubular Heat Exchanger Unit Heater Dimensional Data (in.) (mm)

Models GTND/GTPD	Input MBh	A	B	C	D	E	F	G	H	L	Flue Dia.	Fan Dia	Gas Inlet Nat.	Gas Inlet LP	Unit Weight lbs. (kg)	Shipping Weight lbs. (kg)
010	100.0	33¾ (857)	20¾ (527)	13 3/8 (340)	11 (279)	18 5/8 (473)	18¾ (476)	4¾ (121)	24½ (622)	25¼ (641)	5 (127)	16	½	½	133 (60)	173 (78)
012	125.0	33¾ (857)	20¾ (527)	13 3/8 (340)	11 (279)	18 5/8 (473)	18¾ (476)	4¾ (121)	24½ (622)	25¼ (641)	5 (127)	16	½	½	145 (66)	185 (84)
015	150.0	33¾ (857)	20¾ (527)	13 3/8 (340)	11 (279)	18 5/8 (473)	18¾ (476)	4¾ (121)	24½ (622)	25¼ (641)	5 (127)	16	½	½	155 (70)	195 (88)
017	175.0	33¾ (857)	32¾ (831)	19 3/8 (492)	11 (279)	30 5/8 (778)	30¾ (781)	4¾ (121)	24½ (622)	37¼ (946)	5 (127)	18	½	½	191 (87)	241 (109)
020	200.0	33¾ (857)	32¾ (831)	19 3/8 (492)	11 (279)	30 5/8 (778)	30¾ (781)	4¾ (121)	24½ (622)	37¼ (946)	5 (127)	18	½	½	201 (91)	251 (114)
025	250.0	33¾ (857)	32¾ (831)	19 3/8 (492)	11 (279)	30 5/8 (778)	30¾ (781)	4¾ (121)	24½ (622)	37¼ (946)	5 (127)	18	¾	½	211 (96)	261 (118)



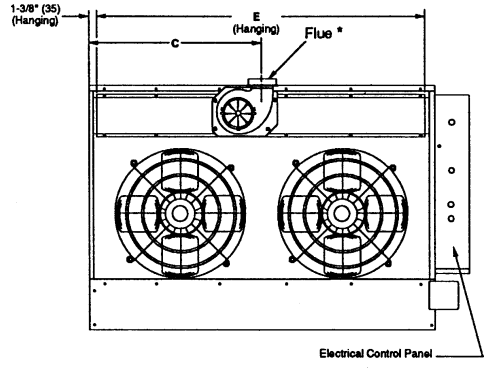
Rear View ***Side View*** ***Front View***

Dimensions are in inches.
(Dimensions in parentheses are in mm.)

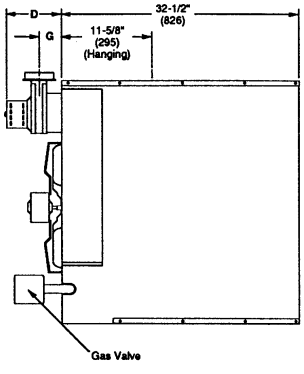
Dimension and Weights

Table DW-8 – Tubular Heat Exchanger Unit Heater Dimensional Data (in.) (mm)

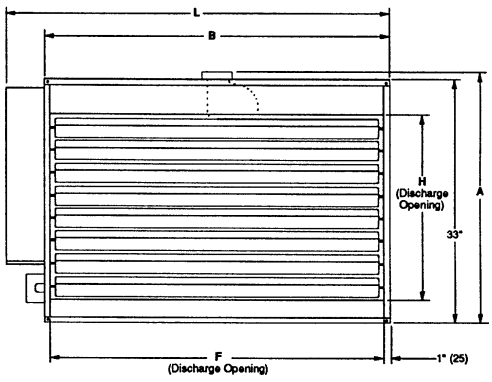
Models GTND/GTPD	Input MBh	A	B	C	D	E	F	G	H	L	Flue Dia.	Fan Dia	Gas Inlet Nat.	Gas Inlet LP	Unit Weight lbs. (kg)	Shipping Weight lbs. (kg)
030	300.0	34 (864)	50¾ (1289)	28 3/8 (721)	12¼ (311)	48 5/8 (1235)	48¾ (1238)	5 1/8 (130)	24½ (622)	55¼ (1403)	6 (152)	(2) 16	¾	½ or ¾	307 (139)	367 (166)
035	350.0	34 (864)	50¾ (1289)	28 3/8 (721)	12¼ (311)	48 5/8 (1235)	48¾ (1238)	5 1/8 (130)	24½ (622)	55¼ (1403)	6 (152)	(2) 18	¾	½ or ¾	321 (145)	381 (173)
040	400.0	34 (864)	50¾ (1289)	28 3/8 (721)	12¼ (311)	48 5/8 (1235)	48¾ (1238)	5 1/8 (130)	24½ (622)	55¼ (1403)	6 (152)	(2) 18	¾	½ or ¾	335 (152)	395 (179)



Rear View



Side View



Front View

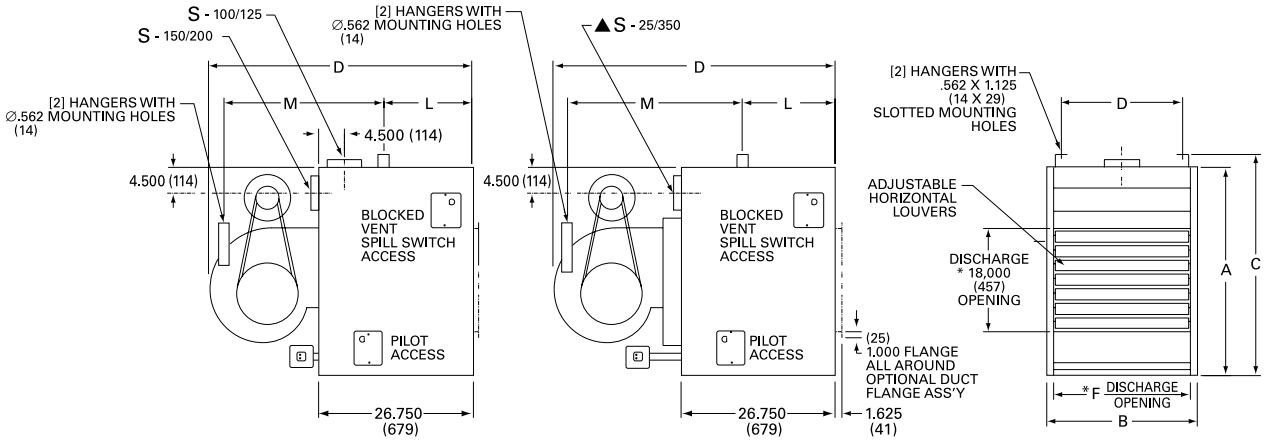
Dimensions are in inches.
(Dimensions in parentheses are in mm.)

Dimension and Weights

Table DW-9 – Centrifugal Fan Gas Unit Heater Dimensional Data (in.) (mm)

Model	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD	GCND/ GCPD
Unit Size	100	125	150	175	200	225	250	300	350	400
"A" Height to Top of Unit	31.25 (794)	31.25 (794)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)	36.25 (921)
"B" Width of Unit	17.875 (454)	20.625 (524)	20.625 (524)	23.375 (594)	26.125 (664)	28.875 (733)	31.625 (803)	37.125 (943)	42.625 (1083)	48.125 (1222)
"C" Height to Top of Hanger	33.25 (845)	33.25 (845)	38.25 (972)	38.25 (972)	38.25 (972)	38.25 (972)	38.25 (972)	38.25 (972)	38.25 (972)	38.25 (972)
"D" Depth to Rear of Housing	42.625 (1083)	44.25 (1124)	44.25 (1124)	47 (1194)	47 (1194)	51 (1295)	51 (1295)	48.25 (1226)	51 (1295)	51 (1295)
"E" Hanging Distance Width	14.75 (375)	17.5 (445)	17.5 (445)	20.25 (514)	23 (584)	25.5 (648)	28.25 (718)	33.75 (857)	39.25 (997)	44.75 (1137)
"F" Discharge Opening Width	15.375 (391)	18.125 (460)	18.125 (460)	20.875 (530)	23.6256 (600)	26.375 (670)	29.125 (740)	34.625 (879)	40.125 (1019)	45.625 (1159)
"L" Hanger Location	15.125 (384)	15.125 (384)	15.125 (384)	15.125 (384)	15.125 (384)	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)	16.25 (413)
M" Hanging Distance Depth	24.625 (625)	25.875 (657)	17.5 (445)	19 (483)	19 (483)	21.875 (556)	21.875 (556)	27.875 (708)	28.875 (733)	28.875 (733)
"S" Flue Size Dia.	6 (152)	6 (152)	7 (178)	7 (178)	8 (203)	8 (203)	8 (203)	10 (254)	10 (254)	12 (305)
Flue Type *	R,V	R,V	R,H	R,H	R,H	R,H	R,H	OV,H	OV,H	OV,#
Blower Size (in)	9	10	10	12	12	12	12	(2) 10	(2) 12	(2) 12
Gas Inlet - Natural Gas (in.)	0.5	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.75
Gas Inlet - LP Gas (in.)	0.5	0.5	0.5	0.5	0.5	½ or ¾	½ or ¾	½ or ¾	½ or ¾	½ or ¾
Approx. Shipping wt. (lb.) (kg)	253 (115)	270 (122)	315 (143)	335 (152)	351 (159)	396 (180)	415 (188)	459 (208)	550 (249)	582 (264)

* R = Round, OV = Oval. Refer to Detail A above for 400 MBh unit.



Side View -100 through 200 ***Side View - 225 through 400*** ***Front View - 100 through 400***

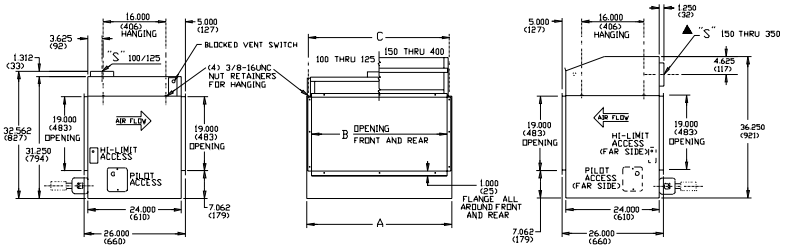
*Discharge opening for optional Duct Flange Assembly.
Dimensions in ( ) are in millimeters.

Dimension and Weights

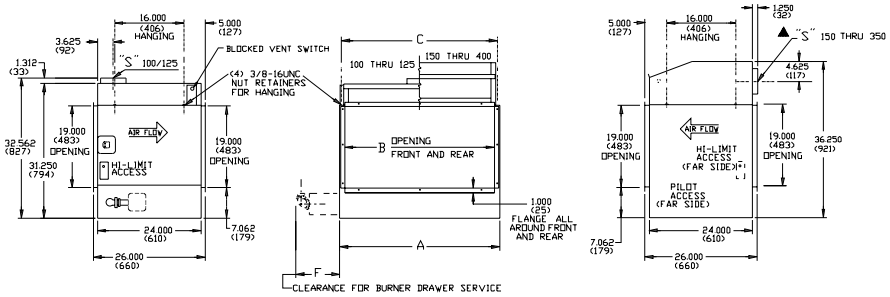
Table DW-10 – Dimensional Data — Standard Duct Furnaces (in.) (mm)

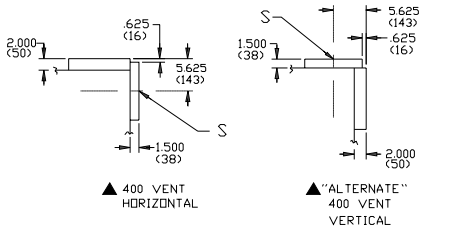
Models GDND/ GDPD	Input MBh	A	B	C	F	Gas Inlet S	Nat.	Weight LP	lb. (kg)
010	100	17.875 (454)	15.5 (394)	17.125 (435)	23.875 (606)	6 RV (152) RV	0.5	0.5	162 (73)
012	125	20.625 (524)	18.25 (464)	19.875 (505)	26.625 (676)	6 RV (152) RV	0.5	0.5	175 (79)
015	150	20.625 (524)	18.25 (464)	19.875 (505)	26.625 (676)	7 RH (178) RH	0.5	0.5	186 (84)
017	175	23.375 (594)	21 (533)	22.625 (575)	29.375 (746)	7 RH (178) RH	0.5	0.5	205 (93)
020	200	26.125 (664)	23.75 (603)	25.375 (645)	32.125 (816)	8 RH (203) RH	0.5	0.5	221 (100)
022	225	28.875 (733)	26.5 (673)	28.125 (714)	34.875 (886)	8 RH (203) RH	0.75	½ or ¾	243 (110)
025	250	31.625 (803)	29.25 (743)	30.875 (784)	37.625 (956)	8 RH (203) RH	0.75	½ or ¾	252 (113)
030	300	37.125 (943)	34.75 (883)	36.375 (924)	43.125 (1095)	10 OVH (254) OVH	0.75	½ or ¾	301 (137)
035	350	42.625 (1083)	40.25 (1022)	41.875 (1064)	48.265 (1235)	10 OVH (254) ORH	0.75	½ or ¾	378 (171)
040	400	48.125 (1222)	45.75 (1162)	47.375 (1203)	54.125 (1375)	12 OVH (305) OVH	0.75	½ or ¾	392 (178)

R = Round, OV = Oval, H = Horizontal, V = Vertical



Side View - 100 through125 Front View - 100 through 400 Side View - 150 through 400



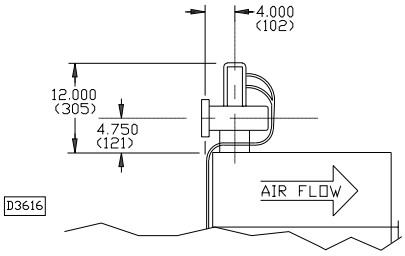


Side View - 100 through125 Front View - 100 through 400 Side View - 150 through 400 400 Vent Horizontal Alternate 400 Vent Special

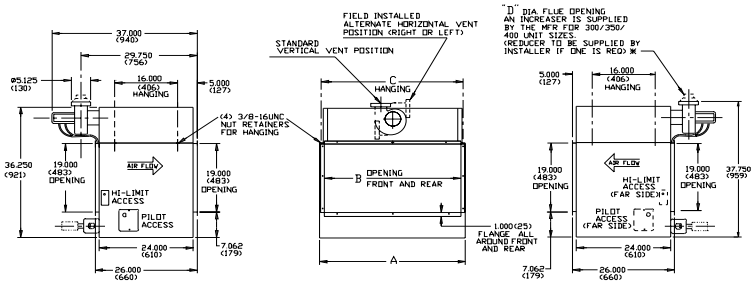
Dimension and Weights

Table DW-11 – High Efficiency Duct Furnace (in.) (mm)

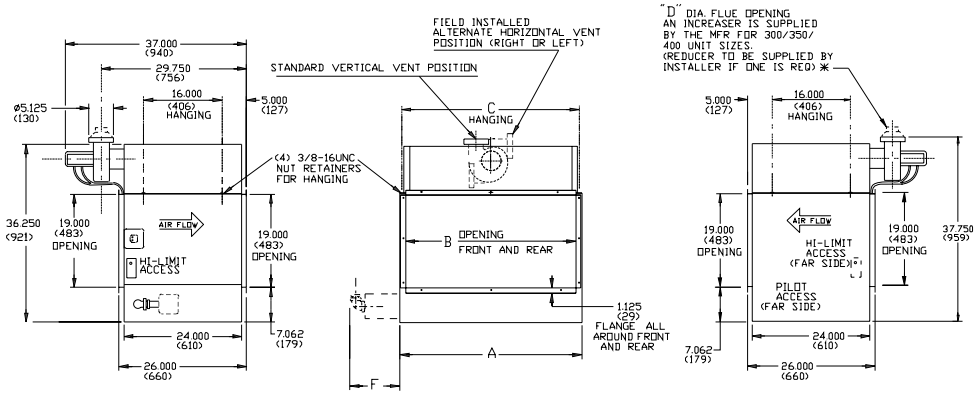
Models GLND/ GLPD	Input MBh	A	B	C	D (Dia.)	F	Gas Inlet Nat.	Gas Inlet LP	Weight lb. (kg)
010	100	17.875 (454)	15.5 (394)	17.125 (435)	4 (102)	23.875 (606)	½	½	173 (78)
012	125	20.625 (524)	18.25 (464)	19.875 (505)	4 (102)	25.625 (651)	½	½	186 (84)
015	150	20.625 (524)	18.25 (464)	19.875 (505)	4 (102)	26.625 (676)	½	½	197 (89)
017	175	23.375 (594)	21 (533)	22.625 (575)	4 (102)	29.375 (746)	½	½	216 (98)
020	200	26.125 (664)	23.75 (603)	25.375 (645)	5 (127)	32.125 (816)	½	½	232 (105)
022	225	28.875 (733)	26.5 (673)	28.125 (714)	5 (127)	34.875 (886)	¾	½ or ¾	254 (115)
025	250	31.625 (803)	29.25 (743)	30.875 (784)	5 (127)	37.625 (956)	¾	½ or ¾	263 (119)
030	300	37.125 (943)	34.75 (883)	36.375 (924)	6 (152)	43.125 (1095)	¾	½ or ¾	312 (142)
035	350	42.625 (1083)	40.25 (1022)	41.875 (1064)	6 (152)	48.625 (1235)	¾	½ or ¾	389 (176)
040	400	48.125 (1222)	45.75 (1162)	47.375 (1203)	6 (152)	54.125 (1375)	¾	½ or ¾	403 (183)



Detail G
Positions - Front - Rear - Right - Left



Side View - 100 through125 ***Front View - 100 through 400*** ***Side View - 150 through 400***



Side View - 100 through 125 ***Front View - 100 through 400*** ***Side View - 150 through 400***

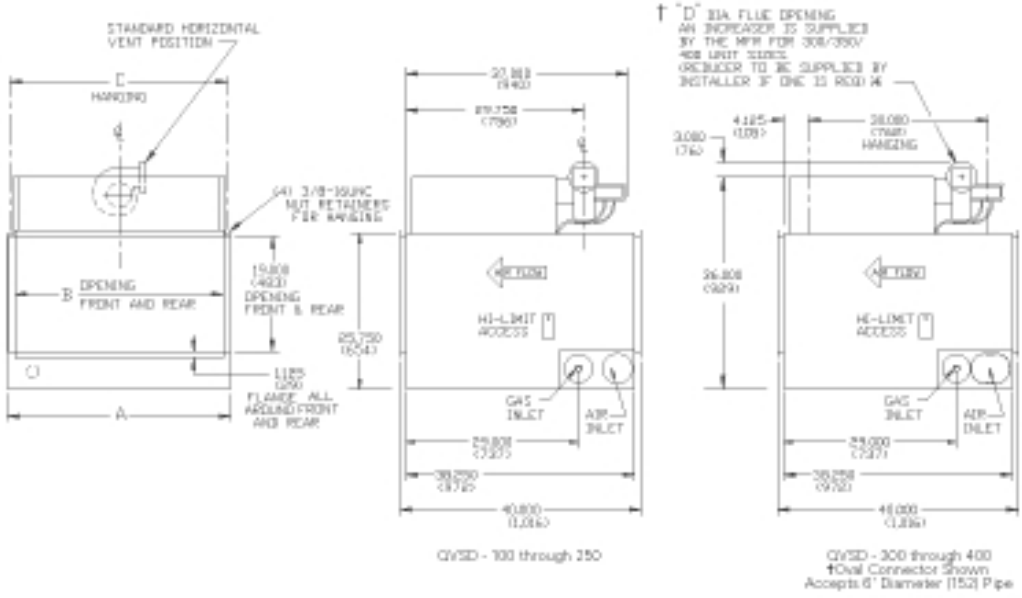
*Canadian units include vent cap and reducer/increaser (if required).
Rear vent position shown. See Detail G for optional top vent position.
Dimensions in ( ) are in millimeters.

Dimension and Weights

Table DW-12 – Separated Combustion Indoor Gas Duct Furnace (in.) (mm)

Models GMND/GMPD	Input MBh	A	B	C	D(Dia)*	Gas Inlet NAT.	Gas Inlet LP	Weight lb. (kg)
010	100	17 7/8 (454)	15 ½ (394)	17 1/8 (435)	4 (102)	½	½	161 (73)
012	125	20 5/8 (524)	18 ¼ (464)	19 7/8 (505)	4 (102)	½	½	180 (82)
015	150	20 5/8 (524)	18¼ (464)	19 7/8 (505)	4 (102)	½	½	188 (85)
017	175	23 3/8 (594)	21 (533)	22 5/8 (575)	4 (102)	½	½	207 (94)
020	200	26 1/8 (664)	23 ¾ (603)	25 3/8 (645)	5 (127)	½	½	227 (103)
022	225	28 7/8 (733)	26½ (673)	28 1/8 (714)	5 (127)	¾	½ or ¾	246 (112)
025	250	31 5/8 (803)	29¼ (743)	30 7/8 (784)	5 (127)	¾	½ or ¾	266 (121)
030	300	37 1/8 (943)	34¾ (883)	36 3/8 (924)	6 (152)	¾	½ or ¾	305 (138)
035	350	42 5/8 (1083)	40 ¼ (1022)	41 7/8 (1064)	6 (152)	¾	½ or ¾	344 (156)
040	400	48 1/8 (1222)	45¾ (1162)	47 3/8 (1203)	6 (152)	¾	½ or ¾	383 (174)

Note:
*"D" diameter equals the air inlet opening and the flue discharge opening.



QVSD - 100 through 250

QVSD - 300 through 400
†Oval Connector Shown Accepts 6" Diameter [152] Pipe

100 through 250 ***300 through 400***

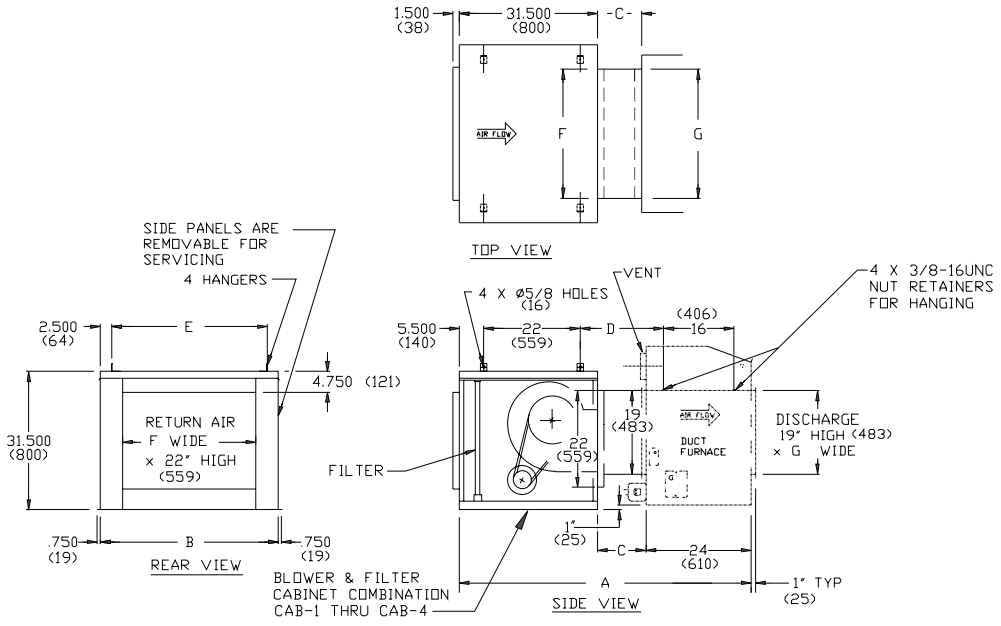
†Oval connector shown accepts 6" Dia. (152) pipe.
*Canadian units include vent cap and reducer/increaser (if required).
Rear vent position shown. See Detail G for optional top vent position.
Dimensions in ( ) are in millimeters.

Dimension and Weights

Table DW-13 – Horizontal Blower Assembly Dimension Data (in.) (mm)

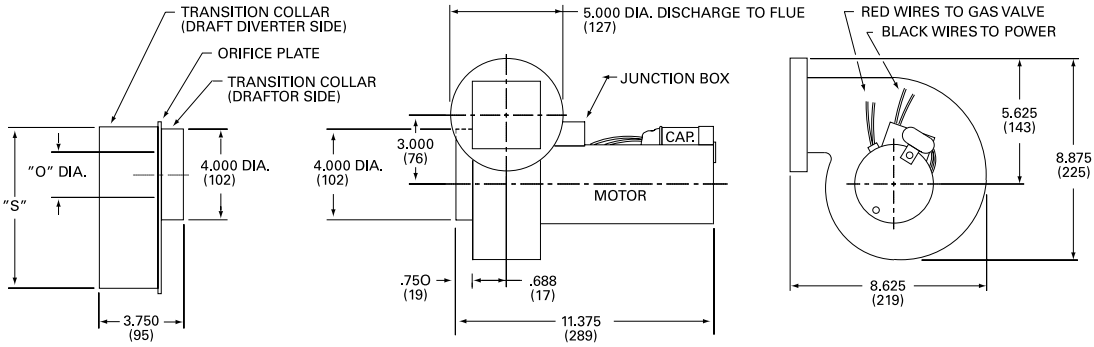
Model No.	Nominal cfm	Duct Furnace Size Used with (Input-MBh)	A	B	C	D	E	F	G	Filter Data Size **	No. Filter Req'd.	Approx. Ship wt. Less Motor lb. (kg)
HBAC-15	1500	100	65-½ (1664)	26 (660)	10 (254)	18 (457)	21-¼ (540)	15-¾ (400)	15-5/8 (397)	25 x 25 x 1	1	135 (61)
		125	65-½ (1664)	26 (660)	10 (254)	18 (457)	21-¼ (540)	15-¾ (400)	18-3/8 (467)	25 x 25 x 1	1	135 (61)
HBAC-20	2000	150	65-½ (1664)	26 (660)	10 (254)	18 (457)	21-¼ (540)	15-¾ (400)	18-3/8 (467)	25 x 25 x 1	1	155 (70)
		175	65-½ (1664)	26 (660)	10 (254)	18 (457)	21-¼ (540)	15-¾ (400)	21-1/8 (537)	25 x 25 x 1	1	155 (70)
HBAC-30	3000	200	65-½ (1664)	40-½ (1029)	10 (254)	18 (457)	35-¾ (908)	30-3/8 (772)	23-7/8 (606)	25 x 20 x 1	2	200 (91)
		225	65-½ (1664)	40-½ (1029)	10 (254)	18 (457)	35-¾ (908)	30-3/8 (772)	26-5/8 (676)	25 x 20 x 1	2	200 (91)
		250	65-½ (1664)	40-½ (1029)	10 (254)	18 (457)	35-¾ (908)	30-3/8 (772)	29-3/8 (746)	25 x 20 x 1	2	200 (91)
HBAC-45	4500	300	65-½ (1664)	60-½ (1537)	10 (254)	18 (457)	55-¾ (1416)	50-3/8 (1280)	34-7/8 (886)	25 x 20 x 1	3	296 (134)
		350	69-½ (1765)	60-½ (1537)	14 (356)	22 (559)	55-¾ (1416)	50-3/8 (1280)	40-3/8 (1026)	25 x 20 x 1	3	296 (134)
		400	69-½ (1765)	60-½ (1537)	14 (356)	22 (559)	55-¾ (1416)	50-3/8 (1280)	45-7/8 (1165)	25 x 20 x 1	3	296 (134)

Note:
Nominal 4,500 cfm unit has two blowers driven by one motor.
*Transition designed for specific duct furnace referenced in the table above. Variations from standard will require field supplied transitions.



Dimensions in ( ) are in millimeters.

Dimension and Weights



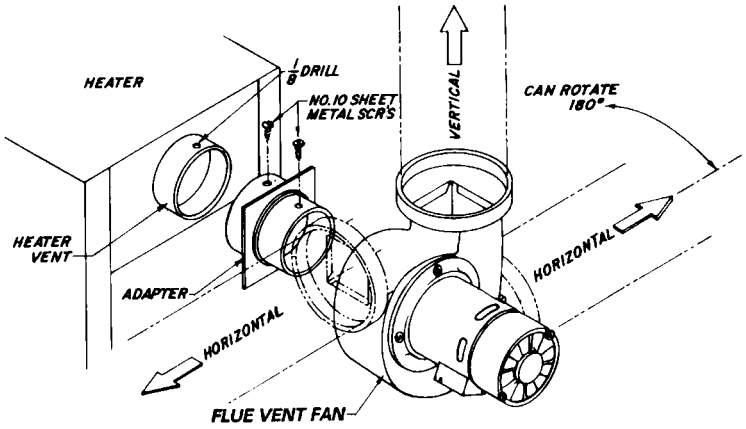
Transition

Table DW-14 – Flue Vent Dimensional Data (Field Installed)

Unit Size Input MBh (kW)	30 (8.8)	45 (13.2)	60 (176)	75 (22.0)	100 (29.3)	125 (36.6)	150 (43.9)	175 (51.2)	200 (58.6)	225 (65.9)	250 (73.2)	300 (878)	350 (102.5)	400 (117.1)
Heater To Ventor Draftor Orifice Size "0"	1-¼ (32)	1-¼ (32)	1-¾ (44)	1-¾ (44)	2-1/8 (54)	2-15/16 (75)	2-½ (64)	3 (76)	3-¼ (83)	3-½ (89)	3-¾ (95)	4 (102)	4 (102)	4 (102)
Normal Flue Size "S"	4 (102)	4 (102)	5 (127)	5 (127)	6 (152)	6 (152)	7 (178)	7 (178)	8 (203)	8 (203)	8 (203)	10 (254)	10 (254)	12 (305)
Type: R-round, Ov-oval	R	R	R	R	R	R	R	R	R	R	R	OV	OV	OV
Recommended Flue Pipe Diameter	3 (76)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	4 (102)	5 (127)	5 (127)	5 (127)	5 (127)	5 (127)	6 (152)
Maximum Length Of Run ft. (m)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)	100 (30.5)

Notes:
1. Installer may choose to use five-inch where four-inch pipe is shown
2. Runs should be reduced as follows for listed accessories. Each 90° elbow-10 feet. Each 45° elbow-5 feet. Briedert cap or equivalent-10 feet.
3. Discharge of the flue vent fan is five inches. Therefore, a transition by the installer is required on 30 through 175 MBh and 400 MBh units.

On units 30-250 MBh, flue vent fan and adapter ship in the same box. On units over 250 MBh, flue vent fan and adapter ship in separate boxes.
Motors are $^{1}/_{12}$th hp. 115V fans draw 2.2 amps. 208 and 230V fans draw 1.1 amps.



Dimension and Weights

Table DW-15 – Factory Installed Flue Vent Data (Standard on High Efficiency Units)

Unit Size Input MBh	30	45	60	75	100	125	150	175	200	225	250	300	350	400
Flue Outlet	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"
Recommended Flue Size	4" R	4" R	4" R	4" R	4" R	4" R	4" R	4" R	5" R	5" R	5" R	6" R	6" R	6" R
Max. Length of Run-Feet[1]	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Notes:
1. Vent pipe equivalent length must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.
2. Horizontal vent pipes should be pitched downward 1/4-inch per foot toward the outlet for condensate drainage.
3. Motors are 1/20 hp. All fans are 115V and draw 1.5 amps.

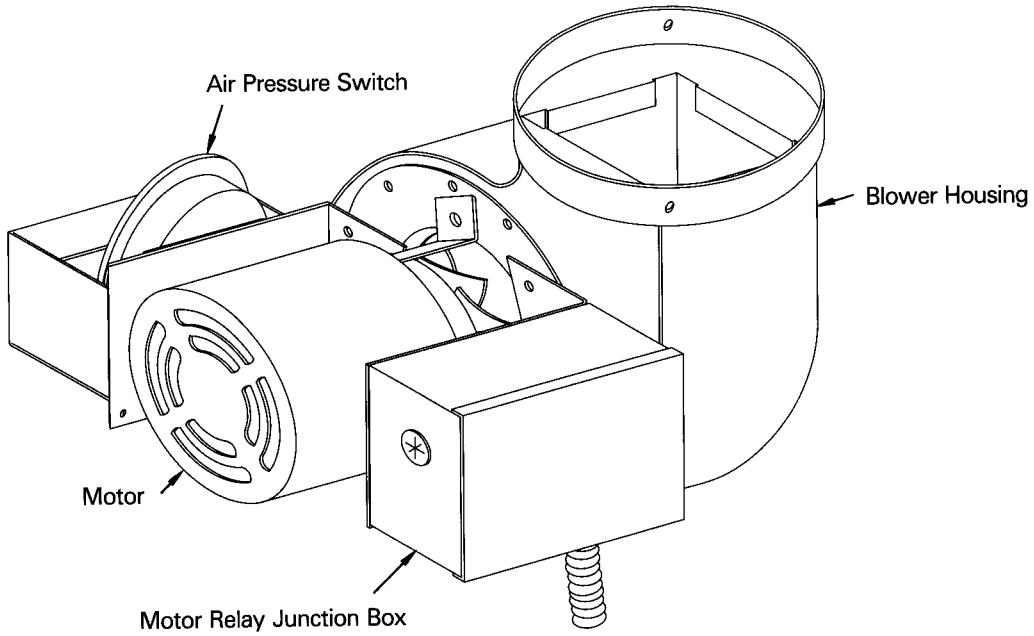
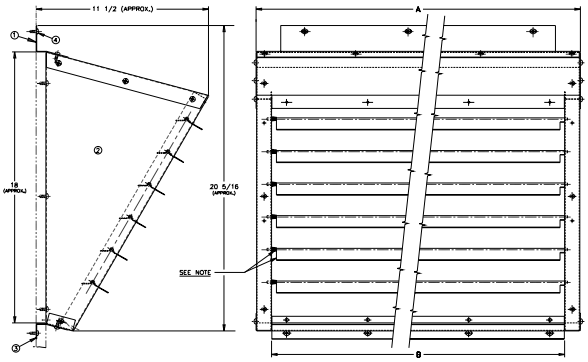


Table DW-16 – Factory Installed Flue Vent Data (Standard on Separated Combustion Units)

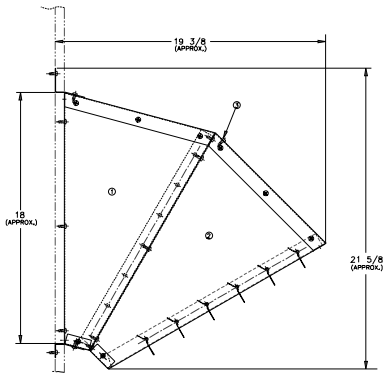
	Unit Size Input MBh	30	45	60	75	100	125	150	175	200	225	250	300	350	400
Flue	Flue Outlet	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"	5 1/8"
	Recommended Flue Size	4" R	4" R	4" R	4" R	4" R	4" R	4" R	4" R	5" R	5" R	5" R	6" R	6" R	6" R
	Max. Length of Run-Feet[1]	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Combustion Air	Combustion Air Inlet	4" R	4" R	4" R	4" R	4" R	4" R	4" R	4" R	5" R	5" R	5" R	6" OV	6"OV	6" OV
	Max. Length of Run-Feet[1]	50	50	50	50	50	50	50	50	50	50	50	50	50	50

Notes:
1. Flue outlet or combustion air inlet pipe equivalent length must not less than 5 feet and must not exceed 50 feet. Equivalent length is the total length of straight sections, plus 15 feet for each 90° elbow and 8 feet for each 45° elbow.
2. Horizontal vent pipes should be pitched downward 1/4-inch per foot toward the outlet for condensate drainage.
3. Motors are 1/20 hp. All fans are 115V and draw 1.5 amps.

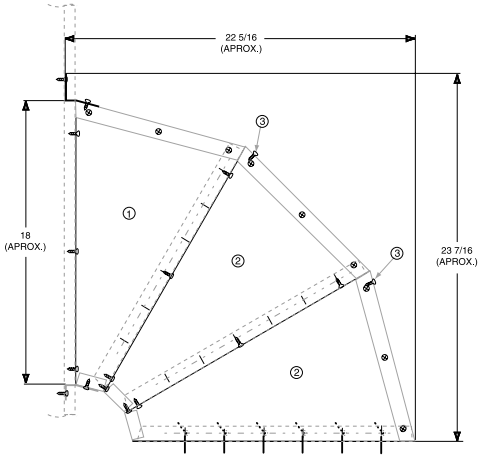
Dimension and Weights



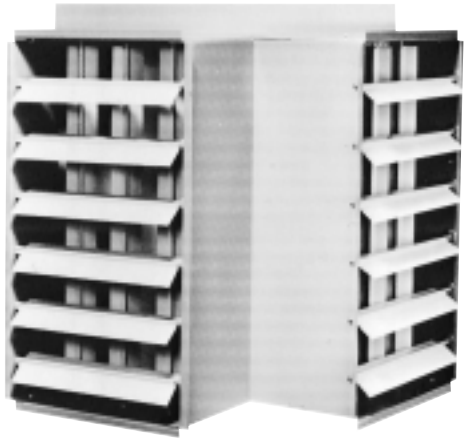
30° Nozzle



60° Nozzle



90° Nozzle



Y-Splitter

Note:
30º, 60º and 90º nozzles are shipped unassembled with bagged hardware and field assembling and installation instruction sheet. The six (6) louvers and louver springs are removed from the unit heaters and transferred to the nozzles in the field.

Table DW-17 — Nozzle Dimensional Data Chart

Unit MBh	100	125	150	175	200	225	250	300	350	400
A										
Inches	17.44	20.19	20.19	22.94	25.69	28.44	31.19	36.69	42.19	47.69
(kW)	(445)	(513)	(513)	(583)	(653)	(722)	(792)	(932)	(1072)	(1211)
B										
Inches	15.368	18.118	18.118	20.868	23.618	26.368	29.118	34.618	40.118	45.618
(kW)	(391)	(460)	(460)	(530)	(600)	(670)	(740)	(879)	(1019)	(1159)

Table DW-18 — Y-Splitter Dimensional Data Chart

Unit MBh	100	125	150	175	200	225	250	300	350	400
Width										
Inches	15-3/8	18-1/8	18-1/8	20-7/8	23-5/8	26-3/8	29-1/8	34-5/8	40-1/8	45-5/8
(kW)	(391)	(461)	(461)	(527)	(600)	(671)	(740)	(880)	(1019)	(1159)
Height										
Inches	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8	21-1/8
(kW)	(537)	(537)	(537)	(537)	(537)	(537)	(537)	(537)	(537)	(537)
Depth										
Inches	11	11	11	11	11	13-1/8	13-1/8	15-1/8	20-5/8	20-5/8
(kW)	(279)	(279)	(279)	(279)	(279)	(334)	(334)	(384)	(524)	(524)

Mechanical Specifications

High Efficiency Propeller and Centrifugal Fan Gas Unit Heaters

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. All units are available for operation on either natural or LP (liquid propane) gas.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifices. The pilot is also accessible through a side panel access plate. All units provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

The heat exchanger, burner and draft hood assembly carry a non-prorated warranty to be free from defective material and workmanship for a period of ten years from date of manufacture, excluding loss due to misuse, negligence, or corrosion by chemicals precipitated in the air.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors reduce scale or foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Fans

Fan blades are constructed of aluminum with an aerodynamic contour. All fans are dynamically balanced for quiet, efficient operation and supplied with a protective type fan guard. Rubber-in-shear isolators provide isolation between the fan/motor combination and the unit heater casing.

All Motors

Standard motors are 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection.

Optional Fan Unit Motors

All motors are 115V, 60 Hz, single phase totally enclosed with built-in thermal overload protection and permanently lubricated bearings.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Two-Stage Gas Valve
(N/A on 30-75 MBh units)
Provides two stages of heat. Ignition is at low fire (50% of the furnaces rated input). Requires the use of a two-stage thermostat.

Hydraulic Modulating Gas Valve
(N/A on 30-75 MBh units)
Provides modulated heat output. Ignition is at low fire (50% input) and discharge temperature sensing bulb located in the air stream modulates the gas input from 100% to 50% rated input. Provided with an automatic electric valve in series which cycles the unit in response to a low voltage single-stage thermostat (thermostat not included).

Hydraulic Modulating Gas Valve with Bypass
(N/A on 30-75 MBh units)
An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of a separate thermostat to control the electric valve.

Electronic Modulating Gas Valve (Natural Gas Units Only)
(N/A on 30-75 MBh units)
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 to 50 percent rated input. Available for use with room thermostat or duct thermostat with remote setpoint adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat.

Electronic Modulating 4-20 mA/0-10VDC Input
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat (NOTE: thermostat must be ordered.) A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Mechanical Specifications

Factory Installed Options

Heat Exchanger Options

Type 409 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel. (Not available on 30, 45, 60 and 75 MBh units.)

Additional Options

Type 409 Stainless Steel Burners (Not available on 30, 45, 60 and 75 MBh units.)

Type 409 Stainless Steel Draft Diverter (Not available on 30, 45, 60 and 75 MBh units.)

Orifices for elevations over 2,000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange
(Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

OSHA Fan Guards – All Propeller Units
OSHA fan guards are available as a factory installed or field installed option.

Field Installed Accessories

High Gas Line Pressure Regulator (Natural gas units only)
Reduces main gas line pressure to a minimum of seven inches W.C.. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Universal tamperproof guard for all room thermostats.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Override room thermostat, for use with duct thermostat and electronic modulating control.

Discharge Nozzles
Y Splitter
30° Downward (100-400 MBh only)
60° Downward (100-400 MBh only)
90° Downward (100-400 MBh only)

Mechanical Specifications

Separated Combustion Centrifugal and Propeller Fan Gas Unit Heaters

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified, 80 percent efficient and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. Units are available for operation on either natural or LP (propane) gas. Standard terms and conditions apply.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel.The bottom panel is easily removed to provide service access to the burners, pilot and orifice. All units provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Fans

Propeller fan blades are constructed of aluminum with an aerodynamic contour. All fans are dynamically balanced for quiet, efficient operation and supplied with a protective type fan guard. Rubber-in-shear isolators provide isolation between the fan/motor combination and the unit heater casing.

Centrifugal fan is belt driven with adjustable pitch motor sheave. Motor and fan are dynamically balanced for quiet operation.

Centrifugal Unit Motors

Standard motors are 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection. Optional 230/60/1 motors are available on all units. Optional 208, 230, 460/60/3 motors are available on 125 through 400 MBh units.

All Motors

All motors are 115V, 60 Hz, single-phase open drip-proof with built-in thermal overload protection and permanently lubricated bearings.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided.The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Electronic Modulating
4-20 mA/0-10VDC Input
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber.The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat (NOTE:The thermostat is not included with the gas control option). A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Mechanical Specifications

Factory Installed Options

Two-Stage Gas Valve
Provides two stages of heat. Ignition is at low fire (50 percent of the furnaces rated input). Requires the use of a two-stage thermostat.

Heat Exchanger Options

Type 409 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gaugeType 409 stainless steel.

Type 321 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gaugeType 321 stainless steel.

Additional Options

Type 409 Stainless Steel Burners

Type 409 Stainless Steel Draft Diverter

Totally Enclosed Motor

Orifices for elevations over 2000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange
(Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

OSHA Fan Guards
OSHA fan guards are available as a factory installed or field installed option.

Field Installed Accessories

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator (Natural gas units only)
Reduces main gas line pressure to a minimum of seven-inches W.C. Pressure at the jobsite must be specified.The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Universal tamperproof guard for all room thermostats.

Discharge Nozzles
Y Splitter
30° Downward
60° Downward
90° Downward

Concentric Vent Terminals

Vertical Concentric Vent Kit
Kit includes 5” cap with special attached non-recirculation disc, special 8” cap with 5” hole and concentric vent box.

Horizontal Concentric Vent Kit
Kit includes 5” cap with special attached non-recirculation disc, inlet air screen and concentric vent box.

Mechanical Specifications

Tubular Heat Exchanger Indoor Gas Unit

Unit is completely factory assembled, piped, wired and test fired. Unit is AGA and CGA certified, over 80 percent thermal (combustion) efficient. These propeller type units are provided with aluminized tubular heat exchanger, in-shot burner, hot surface pilot ignition, individually adjustable and removable louvers, 100 percent baked enamel finish, 115/60/1 supply voltage, removable access door on size 30 to 75 MBh, and hinged access control panel on 100 to 400 MBh, power vented, single-stage combination gas valve, two-stage available on 100 to 400 MBh, 24V control transformer and 115/60/1 volt fan motor with internal overload protection. The size 30 to 90 are available in low profile design.

Residential Garage Certified

The GTNDR unit heaters are AGA and CGA certified for installations in residential garages. With this certification and the low profile design, these GTNDR models are ideal for residential garage, commercial and industrial installations.

Tubular Heat Exchanger

Heat exchanger construction consists of 20-gauge aluminized steel. The tubular design provides maximum and uniform heat transfer. The low pressure drop enables heated air to be evenly distributed. The curved, non-welded serpentine design, experiences less thermally induced stress making it highly durable for longer service life.

Cabinet

The cabinet is constructed of 20-gauge cold rolled steel. All components are individually electrostatically painted.

Hot Surface Pilot Ignition

This ignition is constructed of shock resistant ceramic composite hot surface element. This system does not permit pilot gas to flow unless the hot surface element is present and powered. The low voltage hot surface element lights the pilot quickly for fast heat delivery. All wiring is 24V with no line voltage in the burner area.

Venting

The tubular design is AGA/CGA certified in accordance with Categories I and III venting requirements. Category I enables units to be vented vertically with either single or double wall venting material. Category III allows for horizontal venting utilizing single wall venting material. This venting flexibility makes installation easier and more cost effective.

Control Accessibility

All controls are easily accessible with ignition and fan controls located in one centrally located control panel. The removable door on size 30 to 75 MBh and the hinged access door on the 100 400 MBh provide control isolation.

Motor –115V ODP

Motor is 115V, 60 Hz, single phase, open drip-proof with built-in thermal overload protection.

Optional Feature

Motor — 115V totally enclosed. Motor is 115V, 60 Hz, single phase, totally enclosed with built-in thermal overload protection.

Warranty

The heat exchanger, flue collector and burners are covered by a 10 year warranty from the date of manufacture.

Mechanical Specifications

Propeller Fan Gas Unit Heater

Centrifugal Fan Gas Unit Heater

Indoor Gas Duct Furnace

General

Units are completely factory assembled, piped, wired and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four point suspension hangers on centrifugal fan unit heaters and duct furnaces. All units are available for operation on either natural or LP (propane) gas.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel.The bottom panel is easily removed to provide service access to the burners, pilot and orifices.The pilot is also accessible through a side panel access plate.

On duct furnaces the high limit switch is accessible through a side panel access.

Duct discharge flanges for simple ductwork connection are provided.

All unit heaters are provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

The heat exchanger, burner and draft hood assembly carry a non-prorated warranty to be free from defective material and workmanship for a period of 10 years from date of manufacture, excluding loss due to misuse, negligence, or corrosion by chemicals precipitated in the air. (Not available on duct furnaces.)

Draft Diverter

Standard draft diverter construction is corrosion resistant aluminized steel.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners are individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment. Air shutter adjustment is fixed on duct furnaces when the side access burner drawer is supplied.

Fans

Propeller fan blades are constructed of aluminum with an aerodynamic contour. All fans are dynamically balanced for quiet, efficient operation and supplied with a protective type fan guard. Rubber-in-shear isolators provide isolation between the fan/motor combination and the unit heater casing.

Centrifugal fan is belt driven with adjustable pitch motor sheave. Fan is dynamically balanced for quiet operation.

Motors

Standard motors are 115V, 60 Hz, single-phase, open drip-proof with built-in thermal overload protection. Optional 230/60/1 motors are available on all units. Optional 208, 230, 460/60/3 motors are available on 125 through 400 MBh units.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24-volt combination single-stage automatic gas valve, including main operating valve and pilot safety shutoff, pressure regulator, manual main and pilot shutoff valve, and adjustable pilot valve. Gas valve is suitable to a maximum inlet pressure of 0.5 psi (14-inch W.C.) on natural gas. A 24V control transformer, a spill (blocked vent) switch, high limit and fan time delay relay (optional on duct furnaces) are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Mechanical Specifications

Factory Installed Options

Control Options
Hydraulic Modulating Gas Valve
Provides modulated heat output. Ignition is at low fire (50 percent input) and discharge temperature sensing bulb located in the air stream modulates the gas input from 50 percent to 100 percent rated input. Provided with an automatic electric valve in series which cycles the unit in response to a low voltage single-stage thermostat (thermostat not included). (Not available on 30-75 MBh units.)

Intermittent Pilot Ignition
Solid state ignition control system ignites the pilot by spark during each cycle of operation. When pilot flame is proven, main burner valve opens to allow gas flow to burners. Pilot and burners are extinguished during off cycle. Required on California units.

Two-Stage Gas Valve
(Not available on 30-75 MBh units.)
Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat.

Hydraulic Modulating Gas Valve with Bypass (N/A on 30-75 MBh units)
An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of a separate thermostat to control the electric valve.

Electronic Modulating Gas Valve (Natural Gas Units Only) (N/A on 30-75 MBh units)
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 to 50 percent rated input. Available for use with room thermostat or duct thermostat with remote setpoint adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat.

Electronic Modulating 4-20 mA/0-10VDC Input
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Heat Exchanger Options

Type 409 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel (100-400 MBh only).

Additional Options

Type 409 Stainless Steel Burners
(Not available on 30-75 MBh units.)

Orifices for Elevations Over 2000 Feet
Type 409 Stainless Steel Draft Diverter
(Not available on 30-75 MBh units.)

Summer/Winter Switch

Vertical Louvers

Horizontal Louvers (Duct furnace only)

Duct Discharge Flange
Provided in lieu of louvers on units for use with field ductwork (Centrifugal units only)

Totally Enclosed Motor

Side Access Burner Drawer (Duct Furnace Only)
Allows entire burner drawer to slide out from the side of the unit for service or inspection.

Fan Time Delay Relay —(Duct Furnace Only)
The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing the residual heat from the heat exchanger (Recommended on applications that require intermittent fan.)

One-inch throwaway filters (Centrifugal with enclosure only)

One-inch permanent filters (Centrifugal with enclosure only)

Field Installed Accessories

Natural to LP (Propane) Gas Conversion Package (Standing Pilot Only)

LP (Propane) to Natural Gas Conversion Package

Flue Vent Fan
Flue vent fan provides power venting. Provided with all fixtures for field mounting and wiring, the flue vent fan is activated in response to a single stage thermostat. A centrifugal switch in the flue vent in turn activates the automatic electric gas valve.

High Gas Line Pressure Regulator
Reduces main gas line pressure to a minimum of seven-inches W.C. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure. (Natural gas units only.)

Discharge Nozzles
"Y" Splitter (100-400 MBh only)
30° Downward (100-400 MBh only)
60° Downward (100-400 MBh only)
90° Downward (100-400 MBh only)

Drain Pan (Duct Furnace Only)
Recommended for use with installations on the downstream side of a cooling coil.

Thermostats

Low voltage room thermostat single-stage.

Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage room thermostat, two-stage.

Universal tamperproof guard for all room thermostats.

Low voltage duct thermostat, single-stage.

Low voltage duct thermostat, two-stage.

Room thermostat, electronic modulating control.

Duct thermostat, electronic modulating control.

Override room thermostat, for use with duct thermostat and electronic modulating control.

Mechanical Specifications

Separated Combustion Duct Furnaces

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified, 80 percent efficient and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with two-point suspension hangers on propeller fan unit heaters and with four-point suspension hangers on centrifugal fan unit heaters. Units are available for operation on either natural or LP (propane) gas. Standard terms and conditions apply.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide service access to the burners, pilot and orifice. All units provided with independently adjustable horizontal louvers with stops to prevent total closure.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent scale or foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment.

Controls

A factory installed junction box is provided for all power connections. Standard units are provided with a 24V combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer, high limit and fan time delay relay are provided. The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing residual heat from the heat exchanger.

Electronic Modulating 4-20 mA/0-10VDC Input
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Flue Vent Fan

Flue vent fan provides power venting. Provided factory assembled to a sealed flue collection chamber. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat (NOTE: The thermostat is not included with the gas control option). A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Factory Installed Options

Two-Stage Gas Valve
Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat.

Heat Exchanger Options

Type 409 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel.

Type 321 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel.

Additional Options

Type 409 Stainless Steel Burners

Type 409 Stainless Steel Draft Diverter

Totally Enclosed Motor (Centrifugal fan units only)

Orifices for elevations over 2000 feet

Summer/Winter Switch

Vertical Louvers

Duct Discharge Flange
(Centrifugal fan units only) Provided in lieu of louvers on units for use with field ductwork.

Field Installed Accessories

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator (Natural gas units only) Reduces main gas line pressure to a minimum of seven-inches W.C. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Thermostats

Low voltage room thermostat, single-stage.
Low voltage room thermostat, single-stage with summer/winter switch.

Low voltage duct thermostat, single-stage.

Low voltage room thermostat, two-stage.

Low voltage duct thermostat, two-stage.

Universal tamperproof guard for all room thermostats.

Discharge Nozzles

Y Splitter

30° Downward

60° Downward

90° Downward

Concentric Vent Terminals

Vertical Concentric Vent Kit
Kit includes 5" cap with special attached non-recirculation disc, special 8" cap with 5" hole and concentric vent box.

Horizontal Concentric Vent Kit
Kit includes 5" cap with special attached non-recirculation disc, inlet air screen and concentric vent box.

Mechanical Specifications

High Efficiency Indoor Gas Duct Furnaces

General

Units are completely factory assembled, piped, wired, and test fired. All units are AGA Certified and conform with the latest ANSI Standards for safe and efficient performance. Units are provided with four point suspension hangers, and are available for operation on either natural or LP (propane) gas.

Casing

Casings are die-formed, 20-gauge galvanized steel and finished in baked enamel. The bottom panel is easily removed to provide access to the burners, pilot and orifices. The pilot is also accessible through a side panel access plate. The high limit switch is accessible through a side panel access. Duct discharge flanges for simple ductwork connection are provided.

Heat Exchanger

Standard heat exchanger construction consists of seam welded 20-gauge aluminized steel tubes and 18-gauge aluminized steel headers.

Burners

Burners are die-formed, corrosion resistant aluminized steel, with stainless steel port protectors. Port protectors prevent foreign matter from obstructing the burner ports. Burners individually removable for ease of inspection and servicing. Each burner is provided with an individually adjustable, manually rotated air shutter adjustment. Air shutter adjustment is fixed when side access burner drawer is supplied.

Controls

A factory installed junction box is provided for all power connections. Standards units are provided with a 24-volt combination single-stage redundant gas valve, consisting of a combination pilot solenoid valve, automatic electric gas valve, pilot filter, pressure regulator, pilot adjustment and manual shutoff. A flue vent fan relay and combustion air proving switch is also provided as standard. Standard equipment includes spark-ignited intermittent pilot system with electronic flame supervision. A 24V control transformer and a high limit are provided.

Flue Vent Fan

Flue vent fan is factory assembled to a sealed flue collection chamber and provides power venting. The flue vent fan is activated in response to a low voltage (24V) single-stage thermostat. A combustion air pressure switch is provided as standard to verify proper powered vent flow prior to allowing the gas valve to operate.

Control Options

Two-Stage Gas Valve
Provides two stages of heat. Ignition is at low fire (50 percent of the furnace's rated input). Requires the use of a two-stage thermostat. (Thermostat not included.)

Hydraulic Modulating Gas Valve
Provides modulated heat output. Ignition is at low fire (50 percent input) and discharge temperature sensing bulb located in the airstream modulates the gas input from
100 percent to 50 percent rated input. Provided with an automatic electric valve in series which cycles the unit in response to a low voltage single-stage thermostat. (Thermostat not included.)

Hydraulic Modulating Gas Valve with Bypass
An additional electric valve in parallel bypasses the hydraulic modulating valve, overriding the discharge temperature sensing bulb, allowing full fire. Requires the use of a separate thermostat to control the electric valve.

Electronic Modulating Gas Valve (Natural Gas Units Only)
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from
100 to 50 percent rated input. Available for use with room thermostat or duct thermostat with remote setpoint adjustment. Duct thermostat available with optional override room thermostat which causes the unit to go to full fire when the room temperature falls below the override room thermostat.

Electronic Modulating 4-20 mA/0-10VDC Input
Provides modulated heat output. Ignition is at full fire (100 percent input), and modulates the gas input from 100 percent to 40 percent rated input.

The modulating gas valve shall operate in response to a 4-20 mA or a 0-10 VDC input from an external DDC control.

Heat Exchanger Options

Type 409 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 409 stainless steel

Type 321 Stainless Steel
Heat exchanger tubes and headers are seam welded 20-gauge Type 321 stainless steel

Additional Options

Type 409 Stainless Steel Burners

Orifices for Elevations over 2000 feet

Type 409 Stainless Steel Draft Diverter

Summer/Winter Switch

Horizontal Louvers

Horizontal and Vertical Louvers

Side Access Burner Drawer
Allows entire burner drawer to slide out from the side of the unit for service or inspection.

Fan Time Delay Relay
The fan time delay relay delays the fan start until the heat exchanger reaches a predetermined temperature. It also allows the fan to operate after burner shutdown, removing the residual heat from the heat exchanger.
(Recommended on applications that require intermittent fan)

Mechanical Specifications

Field Installed Accessories

Natural to LP (Propane) Gas Conversion Package (Standing Pilot Only)

LP (Propane) to Natural Gas Conversion Package

High Gas Line Pressure Regulator
Reduces main gas line pressure to a minimum of seven-inches W.C. Pressure at the jobsite must be specified. The regulator is selected to accommodate that specific pressure.

Discharge Nozzles
"Y" Splitter
30° Downward
60° Downward
90° Downward

Drain Pan
Recommended for use with installations on the downstream side of a cooling coil.

Thermostats

Low voltage room thermostat, single-stage

Low voltage room thermostat, two-stage

Low voltage duct thermostat, single-stage

Low voltage duct thermostat, two-stage

Universal tamperproof guard for all room thermostats

Low voltage room thermostat, single-stage with summer/winter switch

Room thermostat, electronic modulating control

Duct thermostat, electronic modulating control

Override room thermostat, for use with duct thermostat and electronic modulating control.

Horizontal Blower Assembly

General

Units are completely factory assembled, and have four-point suspension hangers and filter racks as standard.

Casing

Casings are 18-gauge galvanized steel with baked enamel finish. Side panels are removable for easy servicing and motor maintenance. Duct flanges are provided for simple ductwork connection. Standard filters are one-inch permanent washable type.

Motors

Factory mounted motors are open drip-proof, 115, 230/60/1 or 208, 230, 460/60/3 with built-in thermal overload protection.

Fans

Centrifugal fan is belt driven with adjustable pitch motor sheave. Fan is dynamically balanced for quiet operation.

Factory Installed Options

Insulation

Blower assembly and transition are insulated with fire-resistant, odorless, mat-faced one-inch glass fiber material.

Floor Mounting Legs

Legs allow floor mounting of the blower assembly.

Totally Enclosed Motor

Field Installed Accessories

Optional Filters
(One-Inch Permanent Standard)

One-inch throwaway

One-inch permanent

Transition
When used with a duct furnace, a sheet metal transition is supplied to connect the blower assembly to the duct furnace.

The Trane Company
An American Standard Company
www.trane.com

For more information contact your local distributor (dealer), local district office, or e-mail us at comfort@trane.com

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